ELECTRICAL SOUTH

1943
NOVEMBER

UNIVERSITY OF FLORIDA

52-In Hotel Type

FANS by HUNTER-CENTURY

55th SEASON

24-In "Airspread" Ceiling

HUNTER, who has made fans and ventilators exclusively during 55 years, is now operating under War Production Board restrictions. • No more fans will be made except for the Army, Navy and Maritime Commission. • HUNTER unfilled orders now on hand represent contracts with Government Agencies. • Certain sizes of belted exhaust types can be made available for Government hospitals and other war industries, subject to limited material inventories now on hand.

HUNTER FAN & VENTILATING COMPANY, INC.

Factory: FULTON, N. Y.

General Sales Offices: Memphis, Sterick Bldg. *Eastern Sales Office*: New York, 92 Warren Street *Western Sales Office*: St. Louis, 1706 Olive Street

Sales Offices:
ATLANTA
CHICAGO
DALLAS
HOUSTON
LOS ANGELES
PHILADELPHIA

Zephair Comfort Cooling and Commercial Ventilators

Sales Offices:
BOSTON
CLEVELAND
DETROIT
KANSAS CITY
NEW ORLEANS
PITTSBURGH

● M.I.D. — Material Inspection Department — is the first of many watchdogs that guard the quality of Sylvania Fluorescent Lamps. Before graduation from M.I.D. all materials must pass tough electrical, mechanical, chemical and visual tests.

Here an M.I.D. inspector is checking the quality of hair-fine tungsten, with a microscope, before it is released for fabrication into fluorescent cathodes.

The same painstaking care oversees each step of precision manufacture. When a finished Sylvania Fluorescent Lamp is ready for shipment to the war production front, it has to answer 49 quality questions. To pass this postgraduate course, it has to be the finest in fluorescent.

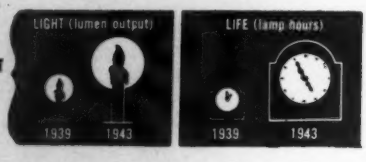
But the Sylvania standard of quality is not frozen into production. There are constant specifications and processing changes. Many of them, like the "Mercury Bomb" method of ultra-precise measurement, conserve metals and man power, but all of them serve to step up fluorescent performance.

Research results are more lumens per watt, longer life, a finer coating and more uniform light color. These are the good reasons why Sylvania Fluorescent Lamps can be specified, with full confidence, for replacements and for new installations authorized to promote visual efficiency in war plants.

SELL SYLVANIA AND GIVE YOUR CUSTOMERS FAR MORE LIGHT AND LIFE FOR THEIR MONEY

Compared with 1939, a dollar invested today in Sylvania Fluorescent Lamps buys more than four times the lumen output and approximately five times the lamp life.

SYLVANIA FLUORESCENT DOLLAR BUYS:



(Based on decreasing price and increasing efficiency and durability of Sylvania 40-Watt White Fluorescent Lamp)

SYLVANIA

ELECTRIC PRODUCTS INC.

Formerly Hygrade Sylvania Corporation
Salem, Mass.

INCANDESCENT LAMPS, FLUORESCENT LAMPS, FIXTURES AND ACCESSORIES, RADIO TUBES, CATHODE RAY TUBES, ELECTRONIC DEVICES

ELECTRICAL SOUTH is published monthly by W. R. C. Smith Publishing Co., Marietta, Ga., and Atlanta, Ga., U. S. A. Subscription rates, United States and Possessions, $1.00 for one year; Canada, $1.50 per year; Foreign Countries, $2.00 per year. Entered as second class matter at the postoffice, Marietta, Ga., under Act of March 3, 1879.

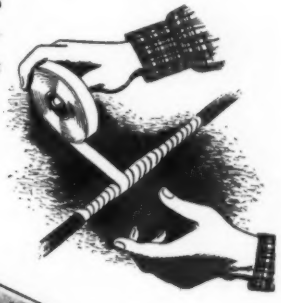
Quality

starts with a roll of cloth . . .

THE first essential for judging the quality of friction tape is the strength and durability of the basic fabric used in its manufacture.

A substantial fabric forms the basis for PANTHER and DRAGON Tapes. This fabric provides a finished product that liberally meets the requirements of current specifications.

Compare *all* of *today's* features of PANTHER and DRAGON Friction and Rubber Tapes with Federal Emergency and A.S.T.M. requirements and you will find the reasons why so many electrical contractors are specifying and using these high grade tapes.



Sold through Recognized Independent Wholesalers . . .

Rubber tapes are available in both PANTHER and DRAGON Brands.

FRICTION TAPE	RUBBER TAPE
1. Guaranteed Footage	1. Guaranteed Footage
2. Substantial Fabric	2. High Grade Compound
3. High Tensile Strength	3. High Tensile Strength
4. High Dielectric Strength	4. High Elongation
5. High Adhesive Strength	5. High Dielectric Strength
6. Uniform Thickness	6. Uniformity of Thickness and Width
7. Uniform Width	7. Excellent Fusion
8. Excellent Tackiness	8. High Insulation Resistance
9. Strong, Durable Core	9. Excellent Tackiness
10. Colorful, Attractive Boxes	10. Colorful, Attractive Boxes

PANTHER & DRAGON
FRICTION AND RUBBER TAPES
HAZARD INSULATED WIRE WORKS — DIVISION OF THE OKONITE CO.
WILKES-BARRE, PENNSYLVANIA • OFFICES IN PRINCIPAL CITIES

3311

"So men may l

Crash landings at sea used to mean "curtains." Now, more and more of our fliers come back . . . thanks to modern life rafts. Today's improved *"See-ability"* is helping workmen build them faster — and better . . .

Let's suppose you're flying a patrol and run out of gas far at sea. Your engine sputters, dies and—down you come.

A tough spot . . . but almost before your ship hits the water you're clear and aboard the rubber raft stowed away for just such emergencies.

Rugged, sea-worthy, these amazing boats have kept fliers and their crews afloat for weeks! No wonder they can take it—when you realize how carefully they are built; how rigidly materials and workmanship are tested and re-tested!

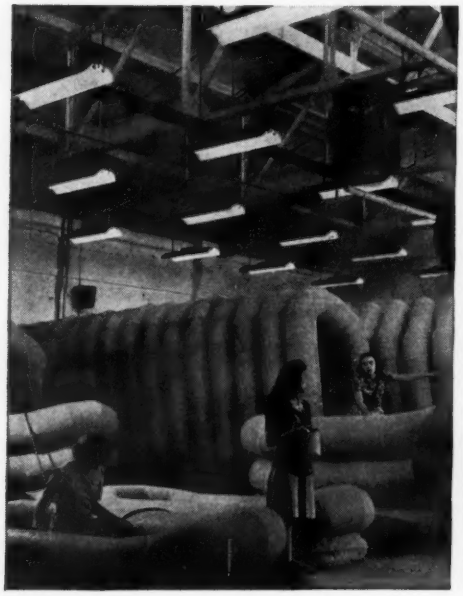
On this life-and-death job "See-ability" through modern improved lighting is playing an important role. It is helping eyes and fingers do their work faster, more efficiently. It is speeding production—reducing "rejects," increasing quality.

In fact, in this as well as other vital war work, millions of Westinghouse Mazda Lamps are bringing better "See-ability," helping set new peacetime lighting standards for the industrial world of tomorrow.

Recommend Westinghouse Mazda Lamps to your customers who are on war work. Today's lamps are brighter, longer-lasting, lower-cost than ever before! Westinghouse Electric and Manufacturing Company, Bloomfield, N. J. *Plants in 25 cities...offices everywhere.*

Easy on the eyes (*opposite page*) . . . Looking for broken threads in boat fabric. Here the operator must look directly into the light. How significant that Westinghouse Mazda Fluorescent Lamps were chosen for this critical task!

KEEP YOUR DOLLARS FIGHTING . . . BUY WAR BONDS



live to fight again!"

Ⓕ Busduct System installed in a small laundry.

Economical . . .

for Small Plants as well as Large

Some plants have been equipped with miles of

Ⓕ BUSDUCT

Many small ones have required a hundred feet, or even less. And, of course, there are many "in-between." In every case, however, the installation of this convenient and flexible method of Ⓕ Busduct distribution for electric light, heat and power has been accomplished at surprisingly low cost.

Both Feeder and Plugin Ⓕ Busduct may be taken down and moved to new locations without appreciable loss of material. Standard sections, with pull boxes, elbows, end closures, tees and crosses, make it possible to fit any desired arrangement, so that changes in location of machines is rendered easy.

Designed for 2, 3 and 4 wire systems, 575 volts AC, maximum.

Ⓕ Busducts are now made under W.P.B. Limitation order L-273. They have the same basic features of construction as the standard model.

The Ⓕ Sales-Engineer Can Help You

in planning and designing an efficient and convenient Ⓕ Busduct Distribution System. No obligation, of course. Bulletin 65 (and supplement) give full details. They will be sent promptly on request. . . . . Frank Adam Electric Company, P.O. Box 357, St. Louis, Missouri.

EST. 1891 — THE SIGN OF A BETTER JOB

Frank Ⓕ Adam

ELECTRICAL PRODUCTS
for War Industry

FRANK ADAM ELECTRIC CO.
ST. LOUIS, MO. U.S.A.

5 STEPS THAT LEAD TO YOUR STORE

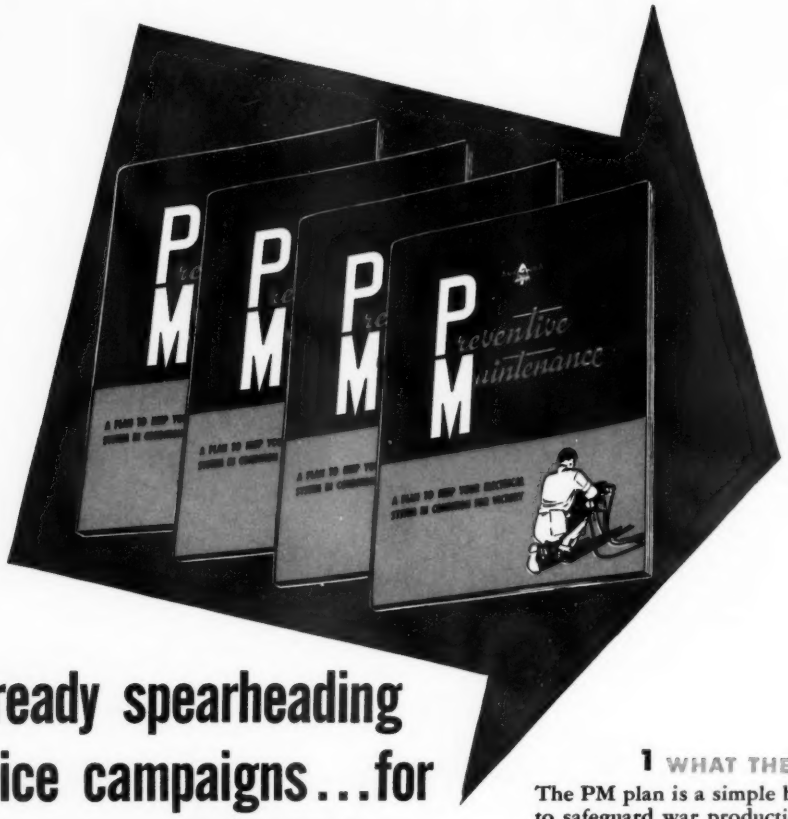
Here's How Universal's "U" Plan for "V" Day Works

1. Forty million full page color messages in 14 national magazines will tell consumers throughout 1944 about Universal's "U" Plan for "V" Day — urging them to plan with you now to secure the housewares they will need after Victory.
2. Each advertisement includes a handy check list upon which readers can indicate the household devices they will need and estimate their approximate total value on a basis of the 1941 price range.
3. Consumers are instructed to take these check lists to the nearest Universal dealer and to ask him for priority consideration as soon as the products are available.
4. The "U" Plan urges consumers to buy War Bonds now so that the desired appliances and housewares can be secured as soon as available.
5. You fill out a duplicate copy of the consumer's list for your prospect file and priority rating. When merchandise is available, you can easily notify your customers by telephone.

Establish your store now as appliance and housewares headquarters. Plan to take full advantage of Universal's contribution to the profitable solution of your post-war problems. For complete details concerning point-of-sale materials, wire, write or phone your Universal distributor or Dept. ES, Landers, Frary & Clark, New Britain, Conn.

UNIVERSAL

LANDERS, FRARY & CLARK ☆ New Britain, Conn.



Already spearheading service campaigns...for more than 60 Utilities

THE PM PLAN

Introduced a short time ago, Anaconda's Preventive Maintenance Plan is being widely used by utilities to help customers keep electrical systems operating *efficiently*—despite shortages in essential wiring equipment.

Already some 60 utilities are actively engaged in this program. With it, they are helping their industrial power customers maintain continuous wartime production by preventing electrical breakdowns.

1 WHAT THE PLAN IS

The PM plan is a simple but comprehensive way to safeguard war production by preventing electrical breakdowns *before they develop.*

2 HOW IT WORKS

The plan provides a practical means of making periodic, systematic analysis of circuits and equipment. Uncovers potential weaknesses . . . suggests ways to correct them . . . prevents overloading of lines.

Data thus gathered aids local W.P.B. Branches in reaching decisions on requests for materials to *prevent* breakdowns.

3 HOW UTILITIES BENEFIT

The PM plan helps utilities maintain close customer contact despite a lack of "something to sell." Offers basis for service campaign that definitely appeals to customers. Puts the utility in a leadership role for furthering war production throughout the area it serves.

If you aren't already utilizing the Anaconda Preventive Maintenance Plan, mail the coupon for full details.

"Tomorrow may be too late . . . do it today!"

ANACONDA'S PREVENTIVE MAINTENANCE PLAN

Anaconda Wire & Cable Company
25 Broadway, New York City, 4

Please send copy of the Anaconda Preventive Maintenance Plan for safeguarding wartime production.

Individual .....

Company .....

Address ..... City .....

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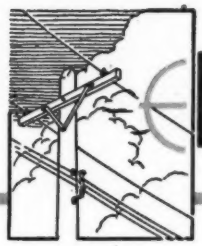
NOVEMBER
1943

Volume 23 No. 11



ELECTRICAL SOUTH

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Manager

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ATLANTA, GEORGIA

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Published Monthly by
W. R. C. SMITH
PUBLISHING CO.
Marietta and Atlanta, Ga.

W. J. ROOKE, *President*
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Contents

Industrial Applications of High-Frequency Heating	9
Women at Work in Industry	12
Baking Ovens for Armature Mass Production	14
Distributor Service Plan Keeps Appliances in Use	17
Dealers' Dramatic Struggle Bolsters Home Morale	18
Wintertime Fan Repair Promoted Successfully	20
Dealer Capitalizes on Display Case Renovation	20
"Keep 'em Smiling" is Utility Service Motto	22
Holiday Gift Goods Keep Dealer in Business	23
Meter Test Table Features Accuracy and Flexibility	24
Basic Operating Principles of Electrical Instruments	25
Odd Groupings for Lap-Wound Top-to-Top Connections	27
Staggered Units Solve Lighting Problem	28
Mercury Lamps Applied to Navy Blimp Hangars	28
Inspectors Discuss Wartime Code Problems	30

Departments

News of the Electrical Industry	32
Personal Notes About Men You Know	44
New Electrical Equipment and Materials	48

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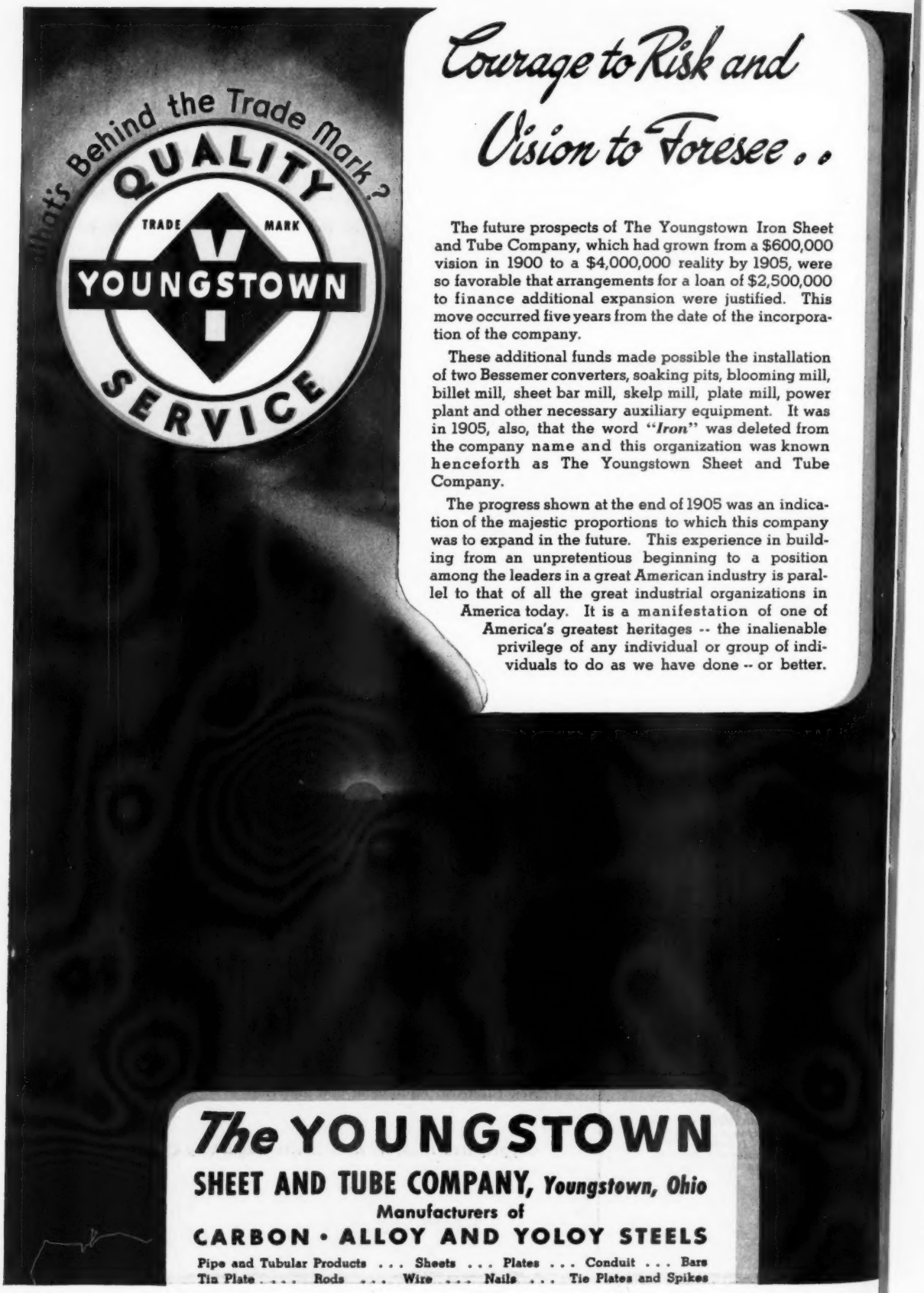
Entered as second class matter at Marietta, Ga., U. S. A., under Act of March 3, 1879



Courage to Risk and Vision to Foresee . .

The future prospects of The Youngstown Iron Sheet and Tube Company, which had grown from a $600,000 vision in 1900 to a $4,000,000 reality by 1905, were so favorable that arrangements for a loan of $2,500,000 to finance additional expansion were justified. This move occurred five years from the date of the incorporation of the company.

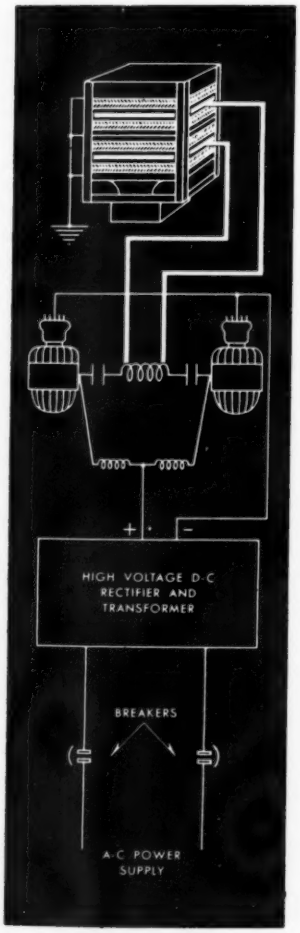
These additional funds made possible the installation of two Bessemer converters, soaking pits, blooming mill, billet mill, sheet bar mill, skelp mill, plate mill, power plant and other necessary auxiliary equipment. It was in 1905, also, that the word "*Iron*" was deleted from the company name and this organization was known henceforth as The Youngstown Sheet and Tube Company.

The progress shown at the end of 1905 was an indication of the majestic proportions to which this company was to expand in the future. This experience in building from an unpretentious beginning to a position among the leaders in a great American industry is parallel to that of all the great industrial organizations in America today. It is a manifestation of one of America's greatest heritages -- the inalienable privilege of any individual or group of individuals to do as we have done -- or better.

The YOUNGSTOWN
SHEET AND TUBE COMPANY, *Youngstown, Ohio*
Manufacturers of
CARBON • ALLOY AND YOLOY STEELS
Pipe and Tubular Products . . . Sheets . . . Plates . . . Conduit . . . Bars
Tin Plate . . . . Rods . . . Wire . . . Nails . . . Tie Plates and Spikes

Industrial Applications of High-Frequency Heating

RAPID HEATING plus the ability to create heat within the work itself are advantages of high-frequency heating that make it increasingly useful to industry. Two methods are commonly employed: heating nonconducting materials by a process called dielectric heating; and heating metallic materials by a process known as induction heating.



A schematic sketch showing the power flow for dielectric heating, using Westinghouse Caltronic equipment.

Dielectric Heating

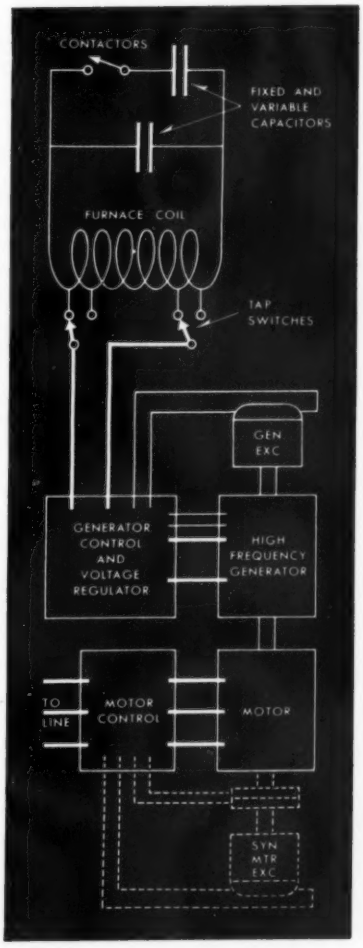
Dielectric heating is based on the physical law that the molecules in a material can be disturbed — that this disturbance can be used to cause friction between them, and that this friction will create heat. By applying very high frequencies to a material, the molecules are subjected to a terrific disturbance, causing them to vibrate and rub together, thus creating heat. Within limits, the higher the frequencies, the greater the heat production.

To induce this disturbance, frequencies up to several million cycles per second are necessary. These are created by an electronic generator, similar to the high power, high-frequency generator used for radio broadcasting. It is already developed to a high state of dependability, is consistent in performance, stable in operation and adapts itself easily to accurate control.

Dielectric heat's most important characteristic is its ability to instantly create heat within the material, instead of forcing the heat in from the outside surface. This makes it particularly adaptable to the fabrication of practically all non-conducting materials which are formed or processed by heat.

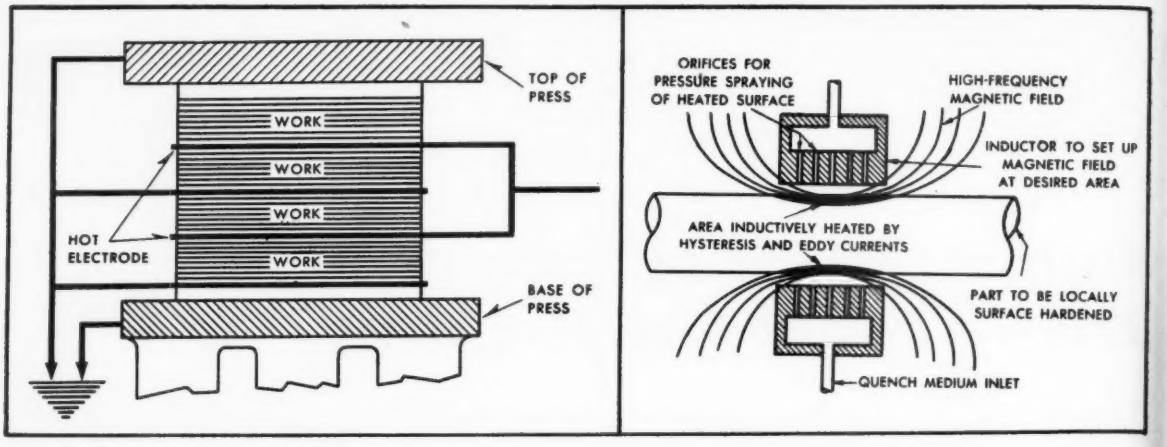
In plywood fabrication the dielectric method makes possible the heating of much thicker sections. The wood can be uniformly heated throughout, regardless of thickness. The glue is polymerized in minutes instead of hours, and there is no damage to the surface or interior of the product.

In the field of plastics, dielectric heat can be applied to almost all processing methods requiring heat. It speeds up the polymerization of the thermosetting resins, such as urea and phenol formaldehydes.



Simplified diagram of high-frequency rotating equipment for use in induction melting.

Where heat is required to induce a chemical reaction, dielectric heating has the advantages of high speed and accurate control. Other advantages are:



(Left) Dielectric heat can be applied to heating presses by connecting the electrodes in various ways. The "sandwich" method of heating shows how four laminated assemblies can be heated at one time. The top and bottom of the press and the center element are kept at ground potential. (Right) Typical surface hardening block combines the coil that induces current into the work, with the quenching orifices.

Produces heat by dielectric losses within the product itself.

Develops uniform heat throughout the product, regardless of poor thermal conductivity or thickness.

Speeds production by creating heat instantly throughout product.

Greater thicknesses can be heated or cured.

Is not limited by high moisture content.

Can be applied without damage to the surface or change of the internal structure.

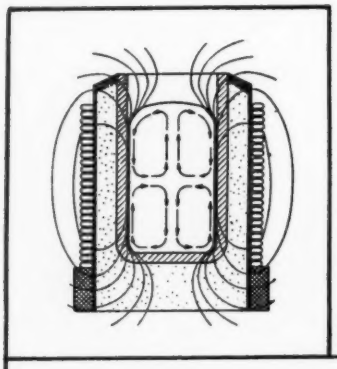
Sets glues or plastic binding materials in minutes.

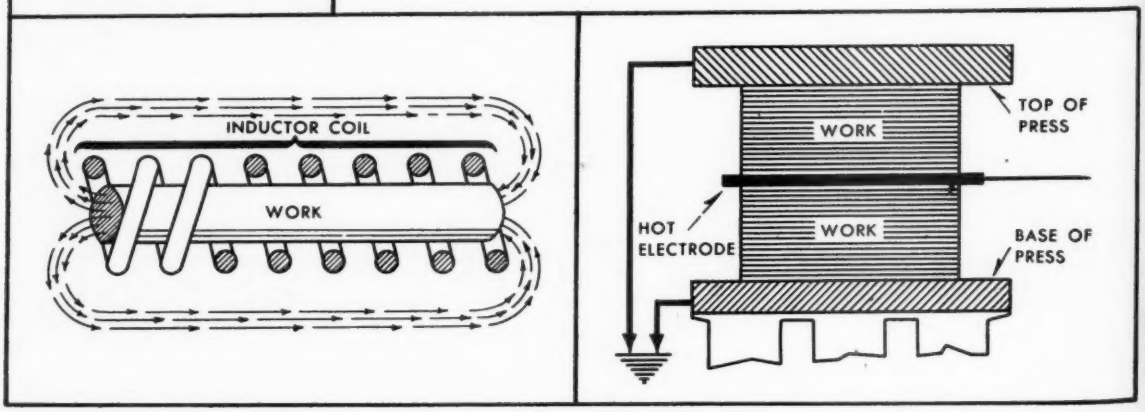
Can be quickly installed on most existing presses, using either hot or cold plates.

The future of dielectric heating is filled with promise. Its use to apply heat to non-metallic materials opens a new field in the design and construction of commercial products.

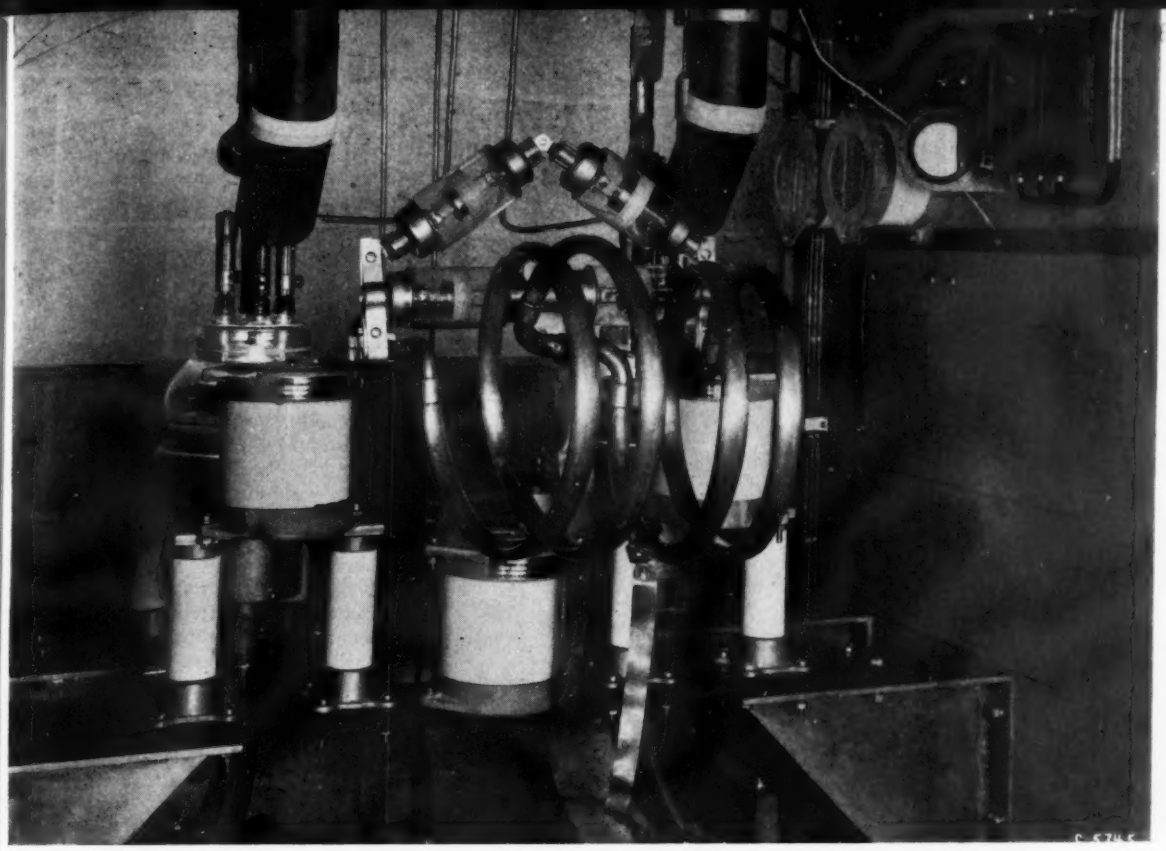
Induction Heating

Its unique ability to "crowd" the surface of the piece with heat, makes it particularly advantageous for surface heating. In hardening operations, it is possible to give a part an extremely hard inside or outside wearing surface, yet leave the strength and machinability intact. It can be used for brazing or soldering operations, permitting multiple processing of many parts in less time. It often makes possible simple inexpensive designs, or the use of more common, easier to get materials. Other common applications are melting of ferrous and nonferrous, annealing, heating for upsetting and forging, sintering powdered metals, and many more. *(Con't on page 62)*



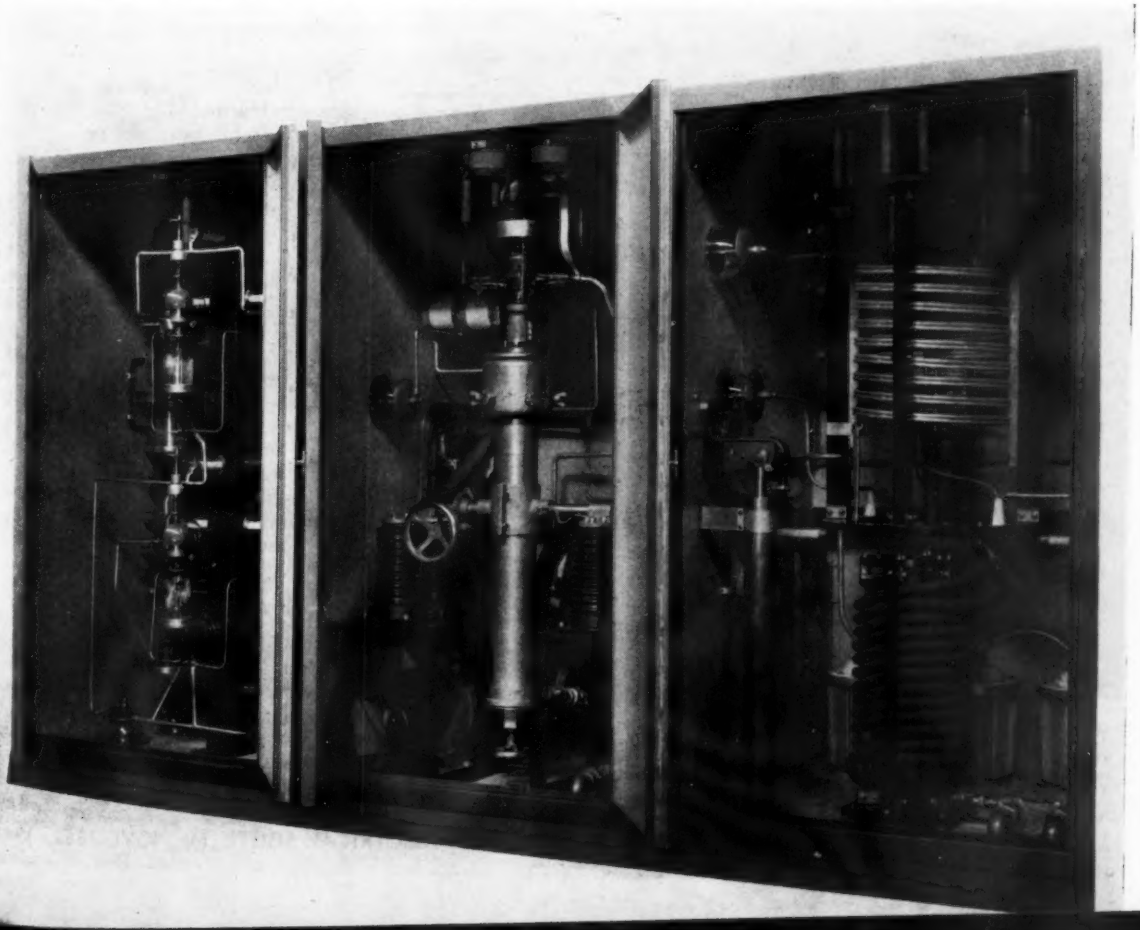


(Left) Melting by induction is quick, clean, accurately controlled. The magnetic forces cause a constant stirring motion. (Lower left) Induction heating is accomplished by converting electrical energy into heat, by arranging the work so that it is in the magnetic field created by high-frequency current through an induction coil. (Lower Right) Dielectric heating is accomplished by subjecting the work to a high-frequency field between two metallic surfaces having a relatively high difference of potential between them.



Above: High-frequency test set-up for dielectric heating of nonconducting materials.
(Westinghouse Photos)

Below: Compact unit containing rectifier, oscillator tube, and oscillator circuit.



Women at Work

Many electrical appliance service and motor repair organizations are using women employees to excellent advantage.

By R. M. Oliver
Proctor Electric Company

THERE ARE 52,000,000 adult women in the United States. By the end of 1943, almost six million of them will be trained and working in essential war industries. Other millions are available to replace men in civilian occupations.

For more than a year Proctor Electric Company, has been operating a factory service station in New York City employing women and women *only*. A gracious, personable woman manages it, sees the customers, keeps things going. Women trouble-shooters diagnose appliance ills, fix them, clean them, test them, shine them up and package them neatly to await their owner's return. Thousands of minor and major ailments have been treated and not one has been brought back because the work was unsatisfactory.

It is conservatively estimated by the War Manpower Commission that 45% of all non-war production workers must be women. The labor forces of war production industries are rapidly reaching a ratio of three women workers to seven men.

Adult women now employed	15,100,000
Women over 64	7,500,000
Women with children under ten	3,500,000
Domestics or self-employed	2,500,000
Widowed, divorced, separated	1,900,000
Married, living on farms	5,300,000
Single	2,600,000
Married in Urban and Non-Farm Areas with no Children Under Ten Years	13,900,000
	52,000,000

Sources: Bureau of the Census, Bureau of Labor statistics, Bureau of Employment Security, War Manpower Commission.

A recent analysis of 1900 war occupations showed only 56 not suitable for women. In civilian pursuits the figure would be even smaller.

A quick glance at the figures below will show the number of women available.

There are not many jobs upon which women are not already employed. A list of the occupations in which women are being satisfactorily employed looks like a personnel director's reference manual. It includes everything from welding and operating turret lathes to driving taxis and serving as trainmen on the country's busiest railroads. It is authoritatively reported by the Women's Bureau of the United States Department of Labor that in many light, skilled jobs women's output is larger than men's.

Even in peacetime, women were almost as numerous as men in the plants of electrical appliance manufacturers. They were skilled, fast, efficient. It requires very little stretching of the imagination to perceive that appliances which women helped to make can be satisfactorily serviced by women at no sacrifice of quality. Many large firms specializing in appliance service work are already using them to excellent advantage.

The fact that women are not already trained for the job you have available need not present an insurmountable obstacle. A year ago not one of the women working in Proctor's New York service station know anything more about electric irons and toasters than the fact that irons are used for ironing clothes and toasters for toasting bread.

Today, they do all the service work for Proctor in the densely populated New York area. They have even made a toaster and iron out of salvaged parts. "They work, too," declares Mrs. Mary Riedel, manager. "One of the workers, Mrs. Laura Fleming, has them in her home and uses them all the time."

When Proctor, like all other appliance manufacturers, received the WPB directive halting civilian production in 1942, it was decided to turn the New York office into a factory-owned and operated service station. Foreseeing manpower troubles ahead, women were hired to do the work. As dis-

The fact that women are not already trained for the job is not an insurmountable obstacle. Laura Fleming, shown repairing a toaster, knew nothing about such appliances a year ago other than their household use but today she is more than a match for any appliance.

trict manager, O. R. McCarthy, had requested a leave of absence to enlist in the army, the job of managing the station was given to his secretary-assistant, Mrs. Riedel. It took one man from the headquarters' service department about a month to train the newly hired women employees. After that they were on their own.

What Proctor has done in New York any dealer can just as easily do, perhaps it would be even easier for the dealer because the women would continue to have his supervision.

If he prefers to do all of the repair work himself or with available male assistance, a dealer can double his own productive time by hiring an intelligent, and friendly woman to handle the sales floor. Women are naturally suited to personal contact work and the right women will give the dealer's business a new and entirely desirable personality. It is not an accident that the "voice with a smile" heard when you pick up your telephone is that of a woman.

Learn Detail Work Quickly

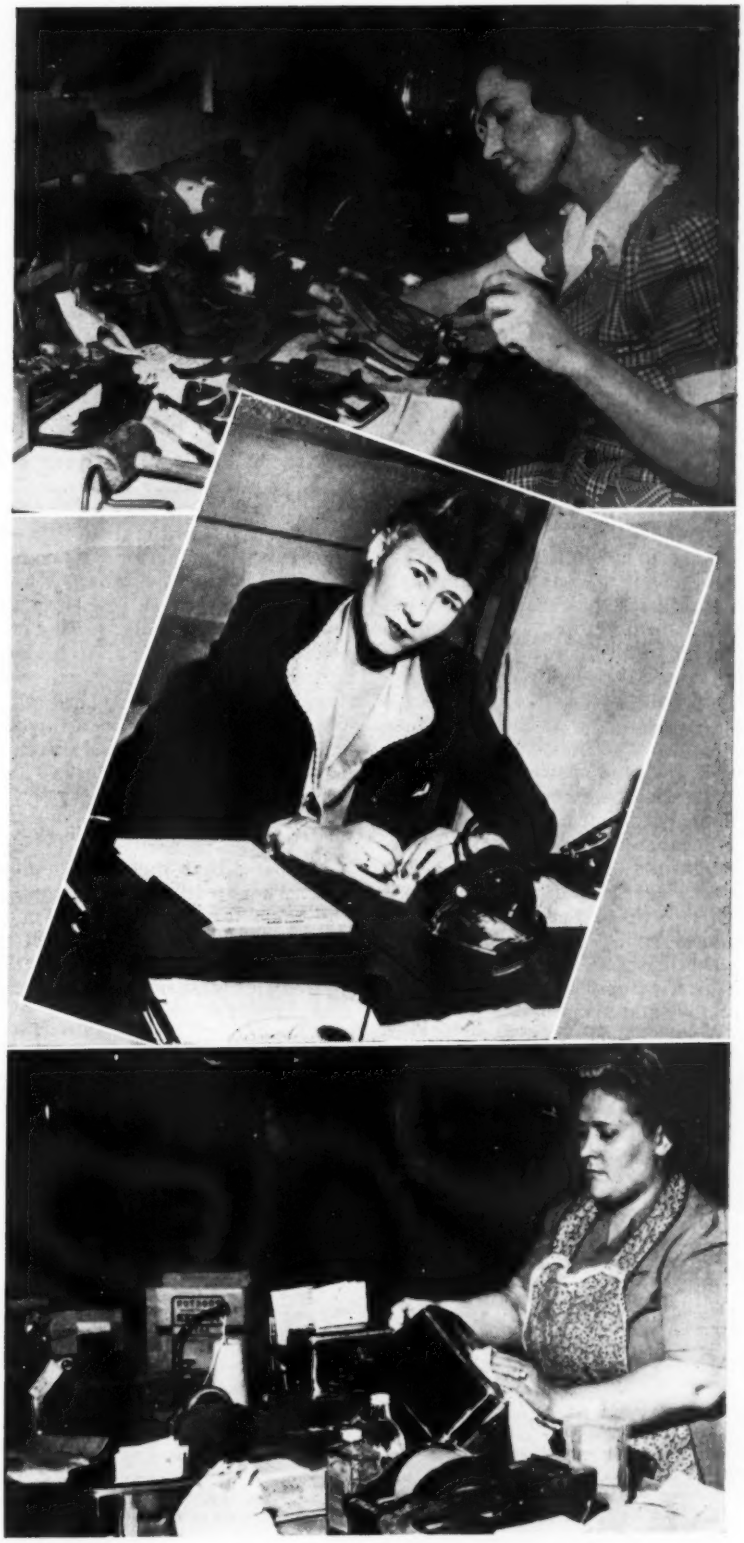
Women love detail. They can relieve tired minds and busy hands of the part of the job men like least. They can be quickly and easily taught to schedule repair work, keep the books, handle time cards, record and maintain parts inventories, follow work through various stages of production to make certain that promised repairs are out on time, do the pricing, wrapping, delivery to customer and put the money in the cash drawer.

Dozens of minor jobs such as repairs, testing, cleaning and polishing can be performed by women with little or no training. They are deft, alert, quick to learn and anxious to please.

Women can *sell*. They can operate your used appliance department. If you are obtaining out-of-service appliances from people not now using them, reconditioning and re-selling them, women can take over a sizeable part of the work involved. They like to use the telephone and are effective in making neighborhood telephone canvasses. They can demonstrate because they use the equipment themselves in their own hands.

No matter what the job in the electrical appliance store; be it repair bench, office manager or

(*Continued on page 60*)



In the center, shown at her desk, is Mrs. Mary Riedel, manager of the Proctor "all-women" appliance service center in New York. This organization, which has just completed its first year of operation, demonstrates the important part women can take in an appliance service business. At top, Lillian Spallone repairs an iron, while May Furey, below, polishes a toaster and prepares it for shipment to its owner.

Varnish Baking Ovens for Armature Mass Production

GASOLINE-DRIVEN electric power plants have probably done more in recent years to bring civilization's comforts to far-off God-forsaken corners of the globe than any other single item of American manufacture.

"Putt-putting" away in 49 different foreign countries before Pearl Harbor, these electric units (350 to 35,000 watts) today are being used by 41 different branches of our armed services alone . . . for use in the air, at sea, and on land. Typical uses: operating searchlights, aircraft detectors, anti-aircraft guns . . . loud speakers, movie projectors, radio transmitters, X-ray equipment . . . refrigerators, hospital apparatus, saws, machinery, ironers . . . plus all the more common applications of light and power for camps, tents, field kitchens, medical stations, battleships, carriers, etc.

Because of the unusually severe conditions of heat, cold, sand, ice, sleet, insects and rough handling which these portable electric plants must endure, their construction is no simple matter. This is particularly true of their coils, stators and armatures.

One of the large manufacturers of such plants is D. W. Onan and Sons. No one knows just how many Onan electric plants are in use today, but Fortune magazine's estimate of 1943 production alone is given as 210,000 individual units, which will give some idea of the company's large output.

That the company *can* turn out so many units today is due to development by Onan officials long ago of a plan of organization with this mass production in mind. They knew that eventually their yearly output would reach such proportions that only a very efficient plant layout and production set-up would keep material flowing smoothly. Accordingly, when things broke loose in Europe and Asia they had already anticipated possible bottlenecks and were set to avoid them.

Ovens Sometimes Bottlenecks

Knowing that the oven department where varnishes are applied and baked is so frequently a "monkey-wrench" in the production line, Onan officials analyzed the difficulties others had experienced and planned to avoid them.

They decided that most troubles in coil-and-armature baking could be traced to one or more of these things: (1) poorly planned production lines, (2) needless handling of material in dipping, loading, etc., (3) improper insulating varnish, or (4) ineffective slow-baking ovens.

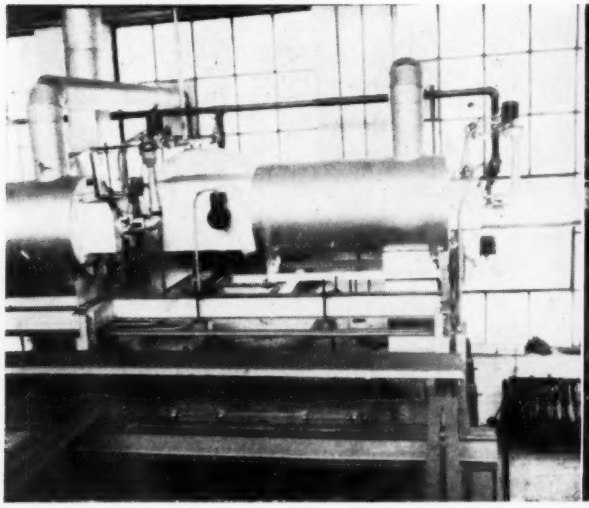
Armature Assembly Line

First of all, they planned each assembly line so that there could be a cumulative addition of parts or services in a logical, easy-working manner. Thus stages of manufacture could be checked easily, new employees would learn the routine faster, possibility of assembly errors greatly reduced.

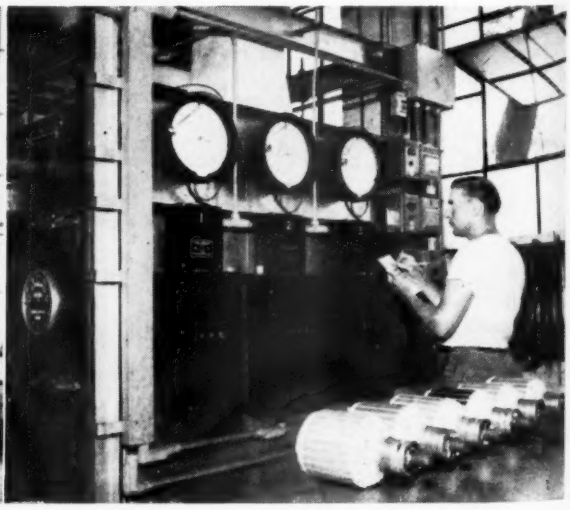
For example, here is the picture of the armature assembly line at one plant of the Onan company:

Working in a long, well-lighted room at endless benches, each with plenty of clear area and space, armature craftsmen assemble each unit from the initial shaft to the ready-for varnishing product.

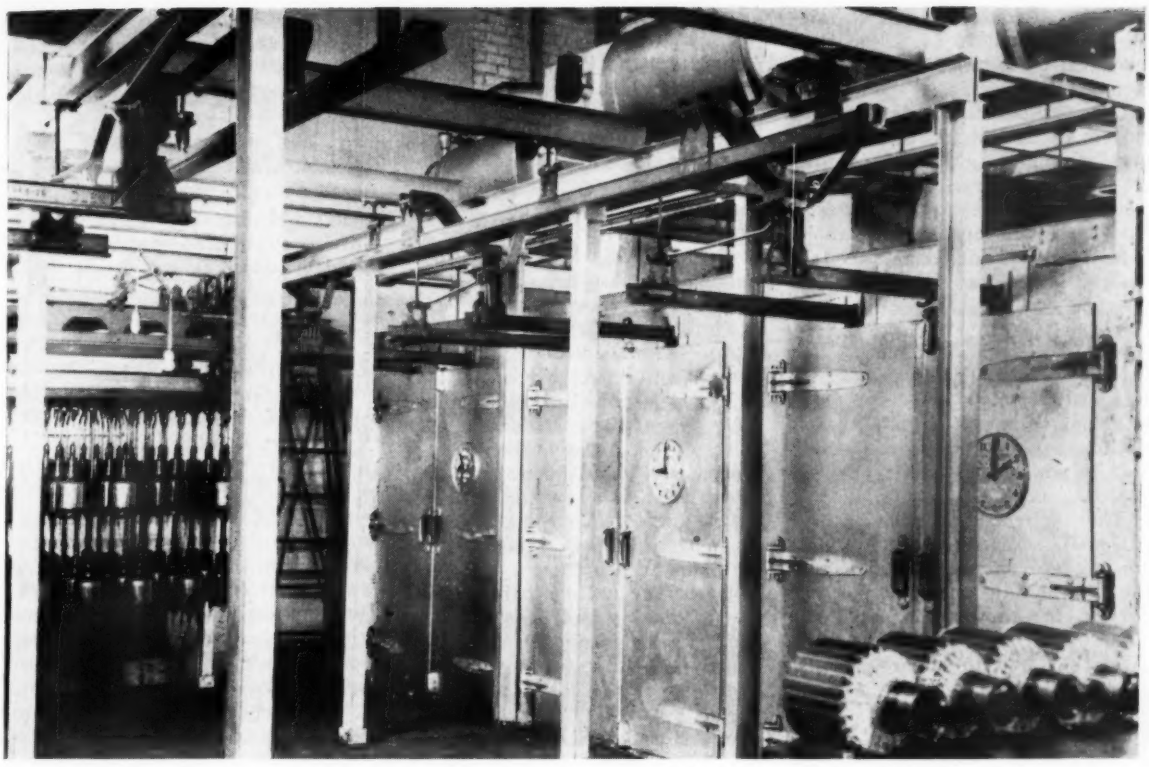
At the beginning of the line, suitable stacks are selected; then spacers commutators and collect-



This view from above shows a portion of the three Despatch gas-fired heaters used in this plant for mass production coil and armature baking. Each heater serves the oven below it. Note forced exhaust stacks.



Side view of the three forced convection ovens for baking varnished coils and armatures showing recording controllers. A dial for each oven indicates and records temperatures in the oven chamber.



Battery of three direct gas-fired Despatch coil-and-armature ovens. Note armatures on rack at extreme left. Rack enters oven chamber on overhead rails. Gas heaters rated at 250,000 BTU are mounted above each oven.

or-rings are added by hand. The shaft is then immediately straightened and aligned on suitable equipment. The drive-hub is also trued-up by lathe at the same time.

The next operation is, of course, the winding. This is done at a long series of continuous benches by women operators who constantly circuit-test their windings to avoid errors which might not otherwise be discovered until a later inspection. Onan's experience with women workers at this task has been very satisfactory in every respect.

After leaving the winding division, armatures are correctly wedged and balanced. For smaller armatures, static balancing on machines is sufficient, although heavier units are balanced dynamically and statically.

This completes the armature, which is now ready to be varnished and baked. Protective caps are applied to prevent varnish from entering portions of the drive assembly of the armature.

Varnish Baking System

In the baking room Onan officials studied the problem of armature-dipping, draining and baking with the idea of saving maximum time and labor. They found that five loading operations were necessary before a given job was ready to leave the baking department. That was a lot; in fact, too much.

Eventually they worked out a system which requires simply that the coils, stators or armatures be placed in a load-rack and left there until they're ready to be removed and sent out for cleaning.

Briefly, this is the system:

Three Dispatch coil-and-armature baking ovens mounted together as a battery face a varnish-tank booth which is fully enclosed and with a double-door. Between the varnish booth and the line of ovens there is an open area about 18 feet across.

In this open area Onan engineers have set up an overhead tramrail system which allows seven racks to be shuttled back and forth and switched to any desired position (in any of the ovens, draining pans or varnish booth).

There are three main tracks extending from inside each oven to a point at the nearest wall. Cutting at right angles across these three tracks is a transfer bridge. This bridge can be swung from one position to another in a few seconds, locked into place, thus transferring a rack in shortest possible time. Tracks left "open" by movement of transfer bridge. have automatic safety latches so that derailment is impossible.

Each of the seven racks is equipped with ball-bearing wheels which travel on rugged steel overhead tracks. Coils, stators or armatures are suspended by hooks from the top of each rack. This holds them firmly during varnishing, draining, baking, redipping and rebaking.

Armature Immersion System

The entire carrier system was designed and installed by Onan engineers, including immersion apparatus for lowering racks into the varnish tank. This consists of a continuation of the main track of the tramrail system into the varnish booth. When a loaded rack is rolled into booth, an operator turns an air-hoist valve and entire track-section descends to immerse load into varnish. About 10 seconds are required for lowering

. into tank. Another valve raises the load back to main-track el when impregnation is comete.

The net saving in the carrier system alone has meant eliminating four handling operations, plus an enormous saving in time and labor as well. And by using 7 load-racks all three ovens can be kept in operation constantly, if desired, with no delay between charges.

High-Resin Varnish Used

Selection of the best varnish was a difficult problem for Onan engineers because of the extremes of heat, cold and climatic condition to which their units are subjected.

They sought a varnish of high dielectric strength, one that would impregnate thoroughly and have smooth baking properties in addition to toughness, hardness, moisture-resistance and resiliency. And they had to have a varnish that would be uniform regardless of the time of purchase or the quantity desired.

Rigorous tests were made of various varnishes over a long period and ultimately a synthetic high-resin product was adopted.

Room temperature was found to be best for satisfactory impregnation of varnish through coils and armatures at the Onan plant. The tank proper is 6'x8'x8' and has a capacity of 1100 gallons.

First dipping of coils, stators and armatures is for 30 minutes, followed by a 40-minute drain. Second dipping after the initial baking is simply "down and up," with the same draining time.

Forced Convection Ovens

The use of forced convection ovens can effectively reduce baking time from 25% to 35%, the present experience of the Onan company proves. In addition the quality of the baked finish is greatly improved and the "cost per charge" of fuel used is remarkably low.

How this is brought about is a rather interesting story in itself.

There are two schools of thought about armature baking and the baking of varnishes, paints or other finishes. One of these advocates infra-red lamps arranged in banks with a conveyor carrying the material through a tunnel-type oven. The other idea is forced convection heating in approved types of ovens where uniformly heated air is smoothly forced through the load of material being baked.

At the various Onan plants, however, both types are used successfully and engineers believe that each system has certain advantages, depending on the particular job involved. At their Arrowhead plant, for example, infra-red ovens bake large-sized armatures very effectively. However, the bulk of materials—stators, armatures and coils—is baked in forced convection ovens.

At the Onan University plant, a battery of three Despatch ovens is employed. These ovens, made by Despatch Oven Company, in Minneapolis, use an especially powerful forced convection heating system (gas-fired), a development of Despatch engineers.

Each oven compartment is 6'x6'x6' inside and accomodates a load-rack holding 72 armatures, twelve 150-lb. stators, or 100 complete sets of coils. Armatures weigh up to 65 lbs. each (6"x15") and stators average 17" in diameter, weight 150 lbs. each. Thus a ten-hour baking output from the battery of ovens averages 7 tons or more. Initial bake of stators and armatures is for 4 hrs. at 300°F.; that of coils is 2 hours at 275°F. Second baking is at the same time and temperature.

Operating at any desired temperature (275°F. to 450°F.), each oven is heated by a separate gas-fired heater mounted overhead; this heater has a capacity of 250,000 BTU's per hour and is equipped with a "controlled combustion" device to allow adjustment for maximum heating efficiency regardless of volume of gas used or whether at high or low temperatures.

Heavy-duty all-welded steel fans force heated air down heat ducts and into oven chamber through a series of adjustable ports. This system allows close control of heat distribution and air-flow so that uniformity throughout entire chamber is closely maintained. Heated air travels horizontally through chamber, entering recirculating ducts on opposite wall.

Temperatures are automatically controlled by Brown instruments (including chart recorders) operating in conjunction with Minneapolis-Honeywell V-413 valves. This assures prompt response to control instruments so that there is no surging overshooting of heat when climbing to temperature, yet no delay in supplying adequate heat needed.

Special ventilation is provided by separate 3 hp exhaust fan, with stack dampers in each oven.

In addition to the standard safety equipment provided with the Despatch ovens, Onan engineers have arranged a system of water-sprays in each oven chamber and Foamite spray in the varnish booth. Four manual valves mounted on red "fire" board control supply to the three ovens and the booth.

Advantages of Methods

So successful has been the operation of the oven department since the installation of this equipment (rack conveyor system, varnish-dip apparatus and forced convection ovens) that at no time has there ever been any production delay.

Even when circumstances have made it necessary to run certain jobs as "emergency, rush!" the work has gone through on schedule without sacrificing any quality whatsoever, either in varnish impregnation or baking. This, for any plant, is something of a record.

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Distributor Service Plan Keeps Appliances in Use

By H. H. Bierman

ALTHOUGH, the War Effort, for various well-understood reasons, has brought about some casualties among electrical appliance dealers, especially those who majored on the larger items, a surprisingly large number of dealers are managing to continue operations in some form or other. Numbered in this latter group is the Domestic Refrigeration Company, Inc., of Miami, Fla.

This firm, of which F. H. McDonald is president and principal owner, became a Frigidaire distributor in 1930. However, Mr. McDonald had already established himself as a dealer 8 years earlier. From the very beginning, an essential part of his merchandising plan was servicing what he sold.

How well that policy has worked out best may be shown by the statement that at the time of writing Domestic Refrigeration has in use in Greater Miami 30,000 pieces of equipment of the manufacture the firm represents.

In order to service these, the company has approximately 2,500 square feet of service space. The latter is almost equally divided between "Parts" and "Shop". Personnel in the Parts Section of the business consists of S. M. Wade, service manager, an assistant to wait on counter trade, and a lady clerk who answers the telephone and handles office detail.

At the outbreak of hostilities, Domestic had 16 men engaged in making installations of new equipment, doing outside service work, and in shop refrigerator overhaul-and-rebuild work. Ten men were lost to the several Armed Services. The duties of the 6 who remained were readjusted to cover both outside service and new installation work.

For rebuild work, two new men were added to the shop personnel. One of these men, formerly was a major appliance dealer, who had discontinued his business, when manufacturers' delivery of new units dried up. The other had been a member of Domestic's sales force. Particularly adaptable to the necessary mechanical training, this salesman, W. D. Barr, is doing good work as a refrigerator service man, according to Mr. Wade.

Zone Plan for Service Men

The outside service men operate on a "zone plan", established some years ago. Under this arrangement each service mechanic regularly covers calls within a specified urban territory. Four men take care of the jobs originating in as many residential districts, while the other two are assigned to downtown territory, where most of the calls are on commercial installations.

This plan, first put into effect for the purpose of systematizing the handling of outside service calls, now proves highly useful in conserving time, tires and gasoline.

Another method by which Domestic Refrigeration has increased the efficiency of its service is the firm's centralization plan for the handling of repairs within Greater Miami. Such work is done in its own shop.

Distributing over a territory extending from Daytona Beach to Key West, the company has at this time an organization of 23 dealers, 21 of whom are located outside of Metropolitan Miami. These out-of-town dealers handle service work for customers within their respective territories, depending on the distributor for whatever assistance they may need. Incidentally, all of the war casualties on McDonald's dealer list have been in Greater Miami.

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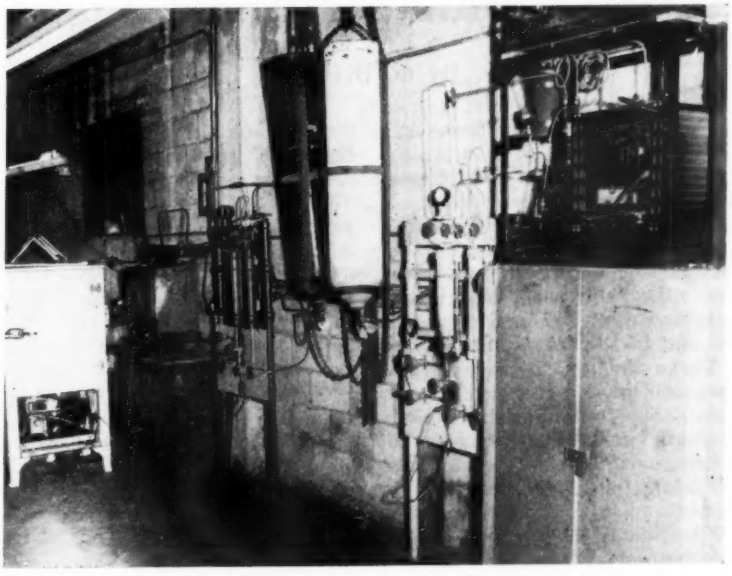

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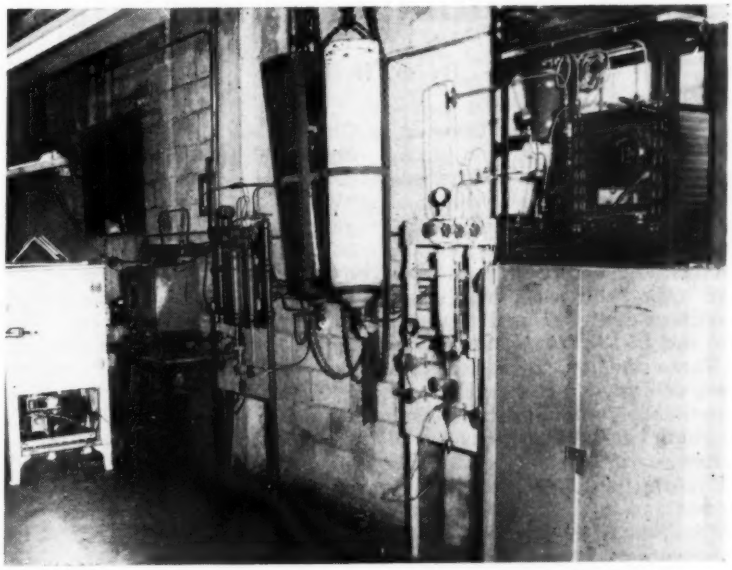

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W. D. Barr, former electrical appliance salesman, has become one of Domestic Refrigeration Company's efficienct service men.

Parts shortage necessitates ingenuity. Here, a service man makes a replacement restrictor valve from 1/8" copper tubing.

ments on many items, when the material was obtainable. In some instances stock was built up to as high as 400% of normal. Nevertheless, Domestic Refrigeration's service men can—and do—improvise replacement parts of some types, if, as, and when necessary to keep a unit functioning.

One such improvisation is the home manufacture of a restrictor valve from copper tubing. As supplied by the manufacturer, this valve, which controls the flow of refrigerant in certain types of boxes, is of "pencil type". A coil made from 2½ feet of 1/8" tubing, having an inside diameter of 1/32", has been used on a number of occasions to replace the pencil-type valve with better-than-good results.

In order to facilitate the charging of boxes with refrigerant, the company's shop made up a modified version of a factory-style charging board. Since boxes to be charged use two different types of refrigerant, depending on the type of box to be charged, the board has provisions for charging units with either kind of refrigerant. Much of the material used in the device was "salvage".

Domestic Refrigeration occupies a large 2-story building at 134 N. W. 3rd Avenue. In addition to its service space, the company has a fine display room, fronting on the Avenue. There also is a drive-in entrance to the service department from a side street. At two other locations the firm has warehouses. One of the latter is a 2-story, 50-ft. by 125-ft. structure. The other is single story, 50 ft. by 100 ft.

Domestic Refrigeration Company's viewpoint toward wartime electrical appliance servicing, as expressed by Mr. Wade is simply told: "The only remedy we know for doing more work with less manpower is for all of us to work harder, longer."

Dealers' Dramatic Struggle Keeps Appliances Operating

By O. D. Hall

WHILE American boys and their allies are fighting heroically on foreign soil to preserve Democracy, electric repair and service men are struggling on the home front to keep the old refrigerator, the washing mechine, and other electrical appliances humming and clicking along until the end of the war.

These battles of the electric shop and repair men are not so spectacular but they have their dramatic interest and have a decisive bearing on the maintenance of healthful conditions in the homes and in the marts of trade.

"Servicing of commercial refrigerators is the source of most of our profits," reports John Waugh, general manager, Waugh & Robertson Refrigeration Co., 27 East Grand, Oklahoma City, Okla., wholesale and retail dealers, with gross receipts for the past 12 months of about $95,000. "When difficulties in securing parts and skilled workmen began to multiply, we were tempted to quit servicing home refrigerators entirely and confine our efforts to supplying parts to the trade and servicing only commercial boxes.

"While I was still in this frame of mind an Oklahoma City physician's wife called our office. She asked me to send a service repair man to her home immediately, stating that her refrigerator had stopped and that the doctor depended upon it to preserve certain medicines necessary in his practice. I started to explain to her that immediate service would be impossible because we were many jobs behind, when she replied: 'You will get no sympathy from me, Mr. Waugh. When my husband has been without sleep for many hours and has to get up in the middle of the night to call on a patient, I give him no sympathy. If he complains, I tell him that when he entered his profession he assumed such duties and that now with a war in progress, he has a double obligation to sacrifice if necessary to help maintain the health of the people at home. And I am not going to give you any sympathy either.'

"You will have a service man in your home within an hour," I replied, " and I took a man from a commercial job to keep that promise. This incident caused me to do some hard thinking for several days and I finally decided to continue repairing home refrigerators," Mr. Waugh declared.

Important Factor in Morale

While the commercial box must be kept fuctioning to preserve the meats, vegetables and other perishable foods, the baby's milk formulas also must be kept from

spoiling in the home. The little pound of meat or butter in the housewife's electric refrigerator means as much to her as the big box full of meat in the butcher shop does to the merchant. Very humanly, the woman thinks of her "points" she will lose, rather than the financial value, when her refrigerator stops functioning, Mr. Waugh said.

Reports from electric refrigerator men from all parts of the state show that they are engaged in a dramatic struggle to keep electric refrigerators in service. Hundreds of these machines are rattling along apparently almost on their last legs and would have been replaced by now if new ones were available.

Since in many localities last summer there was a shortage of ice, these old boxes had to be repaired and kept in constant service, or the morale and the health of the people would have suffered a severe setback. So old boxes, some of them 17 years old or over, were repaired in shops and homes and most of them will keep right on performing their important mission until new electric refrigerators are made available again.

Before the present war about 30 firms were selling and servicing electric refrigerators in Oklahoma City. Now only about ten of them are left and the service and parts demands have multiplied, W. W. Waugh, parts manager and purchasing agent of the Waugh & Robertson firm, said.

"For a time it was almost impossible to get parts for repair of home refrigerators, and when we did get them at at all there was so much delay that it was discouraging," he continued. "A little later federal authorities began to realize that home refrigerators were breaking down rapidly and that the maintenance of these units was as important as keeping the commercial units in operation. Then restrictions were somewhat loosened and now we are able to supply parts more promptly to electric refrigerator service shops throughout the state," he continued. Demands for parts have increased about 65 per cent within the past two years Mr. Waugh said.

Everyday appliance service firms face problems such as this—a 17-year-old refrigerator that must be kept in operation in order to hold up the morale of the "home front." Making the examination, left to right, are W. W. Waugh, parts manager; Claude Waugh, service repairman; Horace Thompson, shop foreman; M. D. Robertson, service manager, and Jack Wilder, service repairman; all of Waugh and Robertson Refrigeration Co., of Oklahoma City, Okla.

John Waugh, general manager, and Paul Stockton, shopman, check compressor of old refrigerator which had operated for many years.

Finding and keeping repair service and shop men is a problem which has been acute for months and is becoming more serious as demands of the war plants and the armed services increase. The Waugh & Robertson firm now have five service men. Manpower shortage has made it necessary for the heads of the firm to help in service work. M. D. Robertson, partner of John Waugh, has taken over the job of service manager and he goes out personally and does repair work in commercial establishments and homes. John Waugh, the other partner, often dons overalls and repairs refrigerators in homes or in the shop.

All employees at time are called upon to do night work. The firm subscribes to an emergency telephone exchange service, primarily set up to handle night calls for physicians and surgeons. Recognizing the importance of the electric refrigerator service industry in maintenance of public health standards, the physicians' exchange is extending its facilities to the Waugh & Robertson Company. Men are kept available to be called by the exchange at night and to go out at any time and repair a refrigerator, so that it will be functioning the following morning. This service principally applies to commercial boxes which contain perishable foods or which serve hospitals, hotels, restaurants, etc.

Now, with the fall months arrived and winter coming, one might conclude that demands on electric refrigerator repair shops would lessen. But this is not true, John Waugh explained. There may not be so many emergency calls but electric refrigerators must be kept running the year around and much work must be done during the so-called off-peak season to get the old boxes back in good condition so that they can meet the demands that will be made upon them next summer.

To meet all these pressing year-around needs the electric refrigerator repair shops must constantly keep men in training for service work. To keep men working for pay which necessarily is lower than can be earned in war industries, involves constant training of new men and instilling in them a high sense of loyalty and responsibility. Electric service men are realizing more and more as the war progresses, that they are important cogs in an essential industry and it is this realization that keeps many of them on the job in electrical service shops throughout the state.

"Where formerly we trained our men in from two to four years, we now must develop good repair men within a year. This requires constant supervisory attention," said Mr. Robertson, service manager.

Messrs. Waugh and Robertson started in business for themselves in Oklahoma City in 1939 as dealers and service men for the Kelvinator refrigerator. They still maintain that agency, but with no new machines on their floors for sale and demands coming from all directions for parts and repairs on many makes of electric refrigerators, thay have expanded their service facilities to the general field, regardless of trade names.

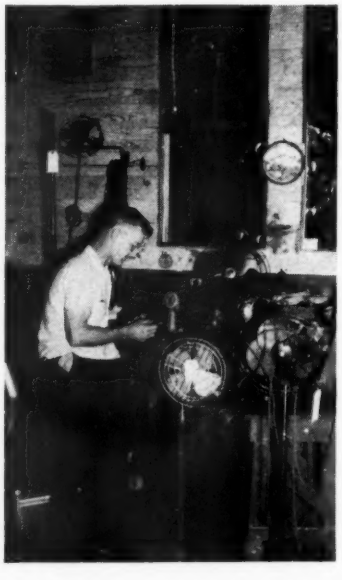
Wintertime Fan Repair Promoted Successfully

RECONDITIONING electric fans is a specialty with Mosley's Electrabode, Montgomery, Ala., where some 500 to 600 fans were handled during the 1943 season.

This concern, at the approach of warm weather, began to advertise its reconditioning service, offering to clean and oil the average size fan for $1.50. This brought in a flock of work, much of it in quantity from offices and business houses. The Farm Security Administration, regional offices, sent over 100 fans at once.

The reconditioning service started the season off with a bang and then as hot weather arrived, fans began coming in for repairs, especially from home owners and others who waited until the last minute. A. M. Mosley, manager, said the average repair job ran $3.00 and included such work as cleaning up corroded parts, replacing bad bushings, and checking over the entire wiring.

Mr. Mosley said the firm did no rewinding of coils, referring some such jobs to motor rewind shops. However, as priorities were needed for such jobs, this service was unavailable to most customers. Also Mr. Mosley pointed out that many of the fans sent in for repairs were low priced products and hardly worth the expense of having the coils rewound. In a few cases, repairmen for the concern were able to isolate a bad wire in the coil and eliminate it without the necessity of a complete rewinding job. But where a complete coil rewinding job was needed, the fan was usually returned to the customer.



Mosley's fan repair shop. A special effort is being made to get customers to send in their fans during the winter months in order to get them into condition for the following summer.

Exterior of the Mosley "Electrabode" in Montgomery, Alabama.

"In our advertising, we stress the point that an electric fan if well taken care of, will give good service indefinitely," said Mr. Mosley. "Yet it is surprising the number of customers who never think to oil their fans. We also receive fans in battered up condition, with bent blades and frames, indicating that they have been dropped or kicked around.

Since the tendency is too often to push a fan back in the corner and let it remain there after the ventilating season, the Mosley Company also features a "fall put-away service," which includes oiling the fan and furnishing a cover for it. This service is especially appreciated by business houses which have a number of fans and go in for systematic maintenance of equipment.

Mosley's Electrabode is distinctive not only in name but in its location in a bungalow in a residential section of the city. In normal times, it does a heavy lighting and fixture business, but with new construction at a standstill on account of the war, it has featured its repair business, especially on fans and vacuum cleaners.

Dealer Capitalizes On Display Case Renovation

THERE ARE all kinds of sidelines which electrical refrigeration dealers can go into during the war period—but according to B. Nolin, partner in the Nolin Brothers Refrigeration Company, Montgomery, Alabama, there is none better than a new field which utilizes the equipment and old parts already on hand.

Down in the Alabama capital city, Nolin Brothers are establishing a unique new market, all their own, in the converting of heavy

old refrigerated display cases (such as are used in supermarkets and grocery stores to display almost every perishable food item) into practical, useful cold-storage boxes and frozen locker plants which are eagerly snapped up by almost every customer contacted. Instead of going wildly into new sideline merchandise, or attempting to "get by" on service or repair work income, Nolin Brothers believe in utilizing the equipment in their shops, and the stockpile of old commercial refrigeration materials which has been accumulating for years.

Nolin Brothers prior to the war were dealers for several types of commercial refrigeration equipment, and in addition, have extended a large shop and showroom in midtown Montgomery to include a fabricating shop—where they built custom-made walk-in and reach-in coolers, beverage dry bottle boxes, and similar tailored-to-the-store refrigeration equipment. There was a crew of salesmen, an installation engineer, and a large shop crew kept busy with this work, as well as service, repair work, and general refrigeration maintenance.

Then Pearl Harbor and consequent total freezes on commercially-manufactured refrigeration put an end to what had been a thriving market.

"We saw a pretty bleak future ahead," Mr. Nolin grinned, "since we could not either obtain prebuilt cases or refrigeration equipment, or buy the essential materials for building our own. We listed all the steps we could take, and determined them as service work on existing installations, a small amount of military or defense plant work, and going into the domestic refrigerator service field.

"Those fields, however, showed no chance to keep our income up to anything like its pre-war level. When I began making calls on our old customers, however, looking for service work, I was struck by the fact that many of them needed additional refrigeration for meats, poultry, dairy products, etc.—and were desperate to get them. Remembering that we had a large junk pile of old cases back of our shop, I began asking whether grocers, farmers, etc., would be willing to purchase converted cold-storage plants turned out from these — and got affirmative answers all around."

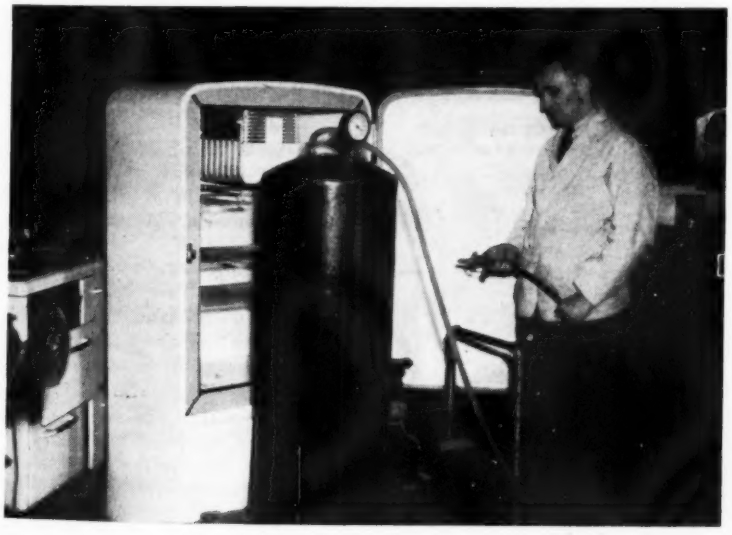
Since that time, Nolin Brothers has been steadily capitalizing on ingenuity with non-essential materials, and the huge stock of old cases which had been accumulating for several years. Live, up-to-the-minue grocers and retailers in the past wanted brand-new, ultra-modern display cases consequently, when anything went wrong with the old ones, the chances were they would simply replace it—consigning the old case to the junkpile. Many of them had simply been hauled in and left untouched for years in the Nolin plant.

Nonessential Materials Used

Now, a systematic remodelling program has been developed, around plywood, plastic, plastic wood, enamel and other available materials for changing these cases into efficient cold storage lockers which go to grocers, delicatessens, restaurants, sandwich shops, and a dozen other markets. Although the company has been able to keep up only a small crew of mechanics, there are enough draft-exempt men to handle the work.

The old cases, of the sloping glass-front type, are first thoroughly cleaned, and the interiors painted. Holes or rips are patched smoothly with whatever material fits best, and polished down. Then the old case is laid on its back, changing the refrigeration compressor, condenser, etc., to a small platform at the end, or locating it away from the box itself if necessary. All interior hardware is removed and re-located to allow for interior shelves or platforms if the customer wishes.

Next, the plate glass in the case front is removed, and this space filled up with plywood layers combined with kapok or other insulation, tightly sealed into the former window space. Sloping toward the user, this makes a convenient top for getting in and out of the box. According to the size of the case, three or four simple lift-up doors are cut through the plywood, giving convenient access to the interior. No two are built exactly alike, since the products of various manufacturers and many sizes involved make each a different problem. In some cases, old wooden types have been completely enclosed in a new plywood shell, sealed with plastic, and equipped with tightly-fitting lift up doors. The refrigeration coils, motor, compressor, etc., in every



Portable Blower For Service Work

This portable compressor for blowing out dirt in electric refrigerators, radios, ranges or other electrical appliances, is the idea of the electrical service shop of Fowler Bros., Knoxville. It was made from an old water tank, with pressure gauge on top, and small motor for compression. It has a long hose, with nozzle, for poking into places where dust is to be blown out. It is on a small stand with rollers, so that it can be pulled about easily. R. P. Brights, parts man, is demonstrating it.

instance are the original equipment repaired, or assembled from old parts on hand. Scores of them have been turned out from old cases, giving efficient, economical refrigeration even though they may be less attractive.

They have been installed behind grocery counters, in stockrooms, and in farmer's homes, successfully in every case. Nolin Brothers now has more requests for this "ersatz" equipment than it can fill, and the company is searching its territory for all the old refrigerated cases it can find, ten, even twenty years old. To speed up the work, Mr. Nolin bought a filling-station grease rack, installed it next to the shop door. It cost him $75, but has saved hours in valuable time because a truck can back us, push a heavy case on to the grease rack which then lowers it to shop-floor level to be pushed inside. (This is handy with repair work on new cases as well as the rebuilt coolers being turned out).

Prices cover a wide range. Some of the units have been sold for as high as $500, others down to $200, $175. In every instance, they have been built as closely to the purchaser's problems as possible. For example, one unit was equipped with an over-powered compressor unit for sharp-freezing poultry for a farmer, another was given a half-horsepower unit to replace a two-horse unit where a more moderate cold was required.

"This kind of work hasn't required a bit of promotion on our part," Mr. Nolin said. "Rather, we find one customer tells another, and the first thing we know we're running low on old cases and remanufacturing materials. We've found that there are lots of old cases still around, and that we can either repair old refrigeration parts or make new ones to put them back in service. Where supermarkets and other food centers are up against vastly increased trade and have no storage space for perishables, Nolin Brothers has won a lot of goodwill with this unusual specialty.

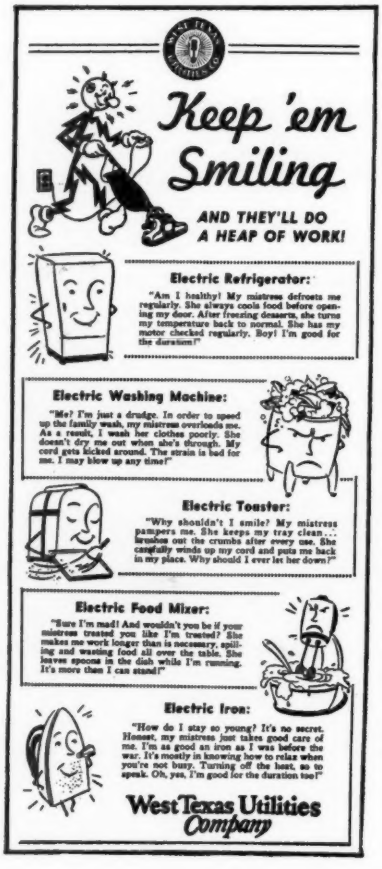
Nothing goes to waste in this plant. Any strip of metal torn from one case is flattened, and may be used on the next to seal up a hole. A wood-working bench allows for making stringers to support the insulated case tops, special shelving, and of course the enclosure replacing the glass.

"Keep 'Em Smiling" Is Utility Service Motto

A LEADER among southwestern utility companies in maintaining a service department to keep appliances going on their lines is West Texas Utilities Company, with headquarters at Abilene. This department is under the supervision of T. E. Kuykendall, general sales manager.

A central or main repair shop has been set up in each of the company's nine districts and as large a staff of service men as possible is being maintained. This is the problem, of coure—manpower—though there likewise is a shortage of some repair parts. All jobs too big for a local repair shop are taken into the nearest district office.

This is a distinct advantage to customers for the reason that many of the small repair shops have been closed, many appliances in use have no representation locally or nearby and, in some cases, even the manufacturers have gone out of business. The WTU repair departments are to take care of such cases and in no way to supplant or displace the independent electric repair shop operator. This new repair service is a wartime measure. The company will be pleased to turn back such work to electrical contractor-dealers and repair shops when they again are in position to handle it.


Keep 'em Smiling
AND THEY'LL DO A HEAP OF WORK!
Electric Refrigerator:
"Am I healthy! My mistress defrosts me regularly. She always cools food before opening my door. After freezing desserts, she turns my temperature back to normal. She has my motor checked regularly. Boy! I'm good for the duration!"
Electric Washing Machine:
"Me? I'm just a drudge. In order to speed up the family wash, my mistress overloads me. As a result, I wash her clothes poorly. She doesn't dry me out when she's through. My cord gets kicked around. The strain is bad for me. I may blow up any time!"
Electric Toaster:
"Why shouldn't I smile? My mistress pampers me. She keeps my tray clean... brushes out the crumbs after every use. She carefully winds up my cord and puts me back in my place. Why should I ever let her down?"
Electric Food Mixer:
"Sure I'm mad! And wouldn't you be if your mistress treated you like I'm treated? She makes me work longer than is necessary, spilling and wasting food all over the table. She leaves spoons in the dish while I'm running. It's more than I can stand!"
Electric Iron:
"How do I stay so young? It's no secret. Honest, my mistress just takes good care of me. I'm as good an iron as I was before the war. It's mostly in knowing how to relax when you're not busy. Turning off the heat, so to speak. Oh, yes, I'm good for the duration too!"
West Texas Utilities Company

The company will be pleased to turn back such work to electrical contractor-dealers and repair shops when they again are in position to handle it.

Manufacturers were contacted or written in an effort to work out a plan to service their appliances when there were no dealers in the territory. If this could not be worked out, WTU would get information as to where such service work could be done and parts secured—all a part of its service to customers whose old appliances must be kept in service for the duration until new ones are obtainable. They found the manufacturers glad to cooperate and now can take care of about 95 per cent of all appliances brought in.

Outside calls to customers are discouraged and only responded to when the appliance involved is a major one—one that cannot well be brought in to their service department. When telephone calls for service come in, the operator gets all information possible in order that real emergency calls may have preference. The manpower situation forces them to make no unnecessary calls, if they can be avoided.

Dealer Campaign Brings In Irons for Resale

AN OFFER of $1 for each old iron brought in was advertised recently by S. H. George & Sons, Knoxville. T. A. Compton, manager of the store's electrical service shop, said the response was good. One woman even brought in an iron in perfectly good shape. Most of the irons received are reconditioned and sold.

The advertisements read: "You Can Help With the War Effort. Due to the need for materials for vital war production, the manufacture of many articles has been curtailed. Among them are electric irons. We will pay you for your used electric iron. A minimum of $1 or more according to its value. Bring them in so that they may be reconditioned and resold to someone who needs them badly."

That idea ties-in with suggestions being made to Knoxville electrical dealers, contractors, and

T. A. Compton, manager of the electrical service shop of S. H. George and Sons, Knoxville, tests irons brought in and sold to the store for $1 as a result of the firm's campaign to obtain old irons for reconditioning and sale to those who need them very much.

servicemen by Jack W. Goans, Power Board dealer coordinator. He wrote to them:

"Today in many attics, basements and closets are appliances that may have become obsolete to the owner which could be reconditioned and sold at a fair profit, and those beyond repair could be used for parts to recondition other appliances.

"The suggested plan is for our dealer and service organizations to purchase these old appliances, recondition them and sell to the trade. We may further suggest this may be done by having each department head notify his employees contacting the public to ask if the customer has any old appliances to dispose of. This will reduce the cost of getting these appliances to your store. Also give you closer relations with your customers, bringing them in for any needed appliance repair.

"There are obsolete refrigerators, ranges and other major appliances from which parts could be taken and used to recondition many much-needed appliances.

"In some instances, the dealer is paying a flat price for irons, toasters, percolators, washers and other small appliances, and others are paying so much per pound. Of course you will want your plan to conform to the policy you are now using and these are only suggestions.

"This plan should benefit you in four ways: (1) reduce overhead expense; (2) show a fair profit; (3) keep your servicemen busy; (4) aid the war effort."

Holiday Gift Goods Keep Dealer Going

THE OPERATOR of Sanders Appliance Company, Abilene, Texas, Charles T. Johnson, saw his appliance business dwindle until there was practically none—just a reasonably good repair business, made difficult by lack of repair parts and replacement units.

He had about 700 installment and open accounts on his books when merchandise became hard to get. Most of these people came into the store regularly to make their payments—and that was all they did, just paid their bills and walked out. They've got money, they want to buy something, but I've got nothing to sell, and will soon be out of business, Johnson reasoned to himself.

He must have something to sell, merchandise of some sort, but what to get was the question. With an open mind, he went to Fort Worth, his nearest large city, and visited a hardware wholesaler. The result of this visit was that he let the wholesaler make up and ship a selection of merchandise, most, if not all, of which was foreign to an electric appliance store.

Holidays Good Time to Start

Although it was strictly staple merchandise and not gift lines, the holiday season proved to be a good time to start general merchandising and his new goods moved right from the start. Many orders have gone to the wholesaler since and the lines have been broadened. Now the Sanders store looks like a combination hardware and variety store, with very few appliances in evidence.

Stocks include dishes (plain and

(*Continued on page 29*)

Enough old irons were brought to the desk of Mrs. Stella Lane, at S. H. George and Sons, to fill the need of many war working families. $1 each was paid for the irons which were then completely reconditioned.

Meter Test Table Features Accuracy and Flexibility

By J. G. Jordan

THE ELECTRIC Power Board of Chattanooga has just put into operation a new meter testing table of unusual design featuring high accuracy, greater flexibility, and time economy.

According to Power Board engineers, this test table is one of the greatest improvements made in meter testing apparatus in the last 20 years. It is known as a Combined Stroboscopic and Timed Revolution Controlled Test Table, since both of these features of meter testing are included in this table.

In other words, if a meter is of such design that it cannot be tested by means of the stroboscopic method, it is only necessary to change the position of one selector switch and then the test can be made by the timed control method. Either method is far superior to present methods, since it eliminates all personal errors, which are small, of course, but nevertheless are there. This is one of the features which the board provides—that of eliminating personal errors, regardless of the magnitude. It further does away with all the calculating necessary in meter testing. Again either method provides this feature which, of course, has important advantages.

It is possible to use the stroboscopic method when making the full load, 50 per cent power factor or light load test of single or polyphase meters that have serrated edge discs and for testing at full load and 50 per cent power factor any meters having the proper marks on the face of the meter disc. When testing meters that have neither stamped strobo disc markings on the disc, nor serrated edge discs, the time revolution control method is utilized. The operator may take each meter as it comes, as he has available these two methods for prompt and accurate calibration and adjustment.

In as much as the stroboscopic equipment uses an optical system, but projects the modulated light direct to the meter disc, the operator may easily observe both the meter disc and the location of the meter adjustment mechanism. Further, it is possible to throw the light at an angle upon a small section of the disc, irrespective of the location of obstacles in the meter such as registers, etc., without the need of elaborate adjustments of the strobo-testing mechanism, and with the majority of makes of meters it is possible to make an as "found" test while the cover is on the meter.

The time controlled revolution method is the most popular since it can be used on the older type of meters which are not provided with the necessary disc notching to make a stroboscopic test.

Further, it provides the tester with time to observe the meter running while under actual test. Then again it can be used to test all types and makes of meters, both singlephase and polyphase.

This method replaces the hand operated potential snap switch and eliminates the need of the meter tester counting disc rotations as when using the catch spot method of test.

How New Table Works

It is to be noted that on both the right and left hand side of the table there is a light source and a photo electric cell. In other words a concentrated light beam is focused on the disc of the meter under test by the lense in the light source. The light shines through the anticreep holes in the disc onto the photo electric cell beneath and causes impulses to be transmitted to the control relay. These impulses are amplified and are used to operate a rotary switch.

There are selector switches provided to select any given number of revolutions both for light and full load and selector switch for the control of both light and full load. Then, also, since the board is a two position board, a selector switch is provided for changing from one meter to the other for test, and while the testing is being carried on automatically, the operator can be placing another meter in position for test, thus saving time.

There is also provided the necessary selector switches for the testing of polyphase meters such as changing from one element to the other without changing any connections to the meter on the board.

Modern type of meter test table recently placed into operation by the Chattanooga Electric Power Board. It is a combination stroboscopic and timed revolution controlled test table.

Also incorporated is an insulation breakdown test which provides a means of testing the insulation of the meter to ground. By pressing a series of buttons, a potential of 1500 volts is applied to both the potential and current elements of the meter, thus assuring that the meter is properly insulated for service. This can all be accomplished without removing the meter from its test position.

Basic Operating Principles Of Electrical Instruments

By G. F. Gardner*

Part 2.—Alternating Current Instruments.

THE instruments previously discussed measure d-c quantities only, because the field supplied by the permanent magnet is unidirectional. If we should take off the permanent magnet and replace it with a coil or wire suitably arranged with respect to the moving coil, such as shown in Fig. 8, we could connect the fixed and moving coils in series. Then, by sending alternating current through the instrument, we could obtain a deflection which would bear a definite relation to the current being sent through the coil system. This happens, because,

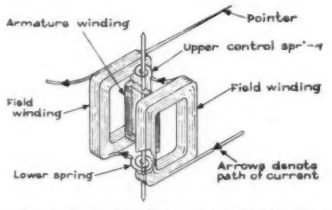


Fig. 8. Elementary diagram of dynamometer-type instrument

when the alternating current reverses, the polarity of the fixed and moving coils reverses at the same instant—and we obtain a pulsating torque which is always in the same direction. This illustrates the dynamometer principle.

In actual practice, the shapes of the moving coils for alternating-current instruments are different from the moving-coil shapes used for direct current. Usually, these coils for a-c instruments are circular as in Fig. 9, and so proportioned as to afford maximum efficiency. Even with this construction, alternating-current instruments require a larger amount of power for full-scale deflection. The current being measured must not only supply the energy for the moving coil, but must also supply energy for the field winding, which in the case of the permanent-magnet instrument was supplied by the magnet. Another important consideration is to keep any closed loops of wire or masses of metal well away from the fixed and moving coils. Such material would form a path in which current would be induced, and it would cause errors in the instrument indication when the instrument was used on alternating current. These induction troubles do not occur with direct current.

Methods of Damping

The instrument shown in Fig. 8 would have very objectionable characteristics, because, when we apply current, the pointer would oscillate back and forth a number of times before coming to rest. In other words, it would not be properly damped.

To obtain damping, two methods are in general use. One involves the use of a thin aluminum or copper vane which swings between the poles of a small permanent magnet. When the moving element deflects, a current is induced in the aluminum vane. The field produced by this current interacts with the field of the permanent magnet and tends to oppose the motion of the moving element, thus causing the system to come to rest quickly. The other method of obtaining damping involves the use of a closed box in which a vane swings in a restricted space. This method of damping is called air damping, while the method which uses the aluminum vane and permanent magnet is known as magnetic damping. Both methods are in common use, although it is considerably easier to obtain very high values of damping with the magnetic method. Air damping calls for the use of quite precise construction in respect to clearances and general workmanship.

Fig. 9. Essential parts of a dynamometer instrument

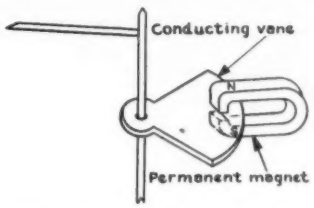


Fig. 10. Details of magnetic-damping mechanism

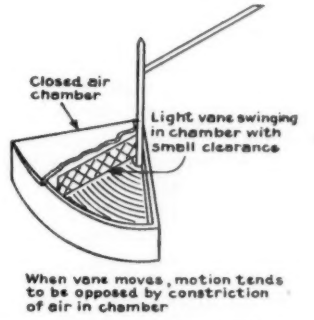

Closed air chamber
Light vane swinging in chamber with small clearance
When vane moves, motion tends to be opposed by constriction of air in chamber

Fig. 11. Details of air-damping mechanism

In Fig. 10 and 11 are shown instrument-damping mechanisms of the magnetic and air types, respectively.

Voltmeter Construction

If we take the dynamometer-type (alternating-current) milliammeter described in a preceding paragraph, and add suitable series resistance constructed of zero-temperature-coefficient ma-

*Mr. Gardner is associated with General Engineering Laboratory, General Electric Co., Schenectady, N. Y.

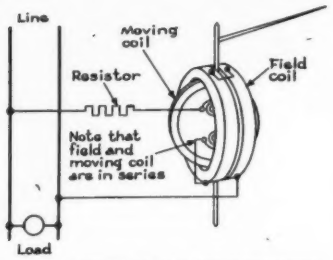


Fig. 12. Schematic view of a dynamometer element arranged to make a voltmeter

terial, as shown in Fig. 12, we will have a voltmeter which can be used to measure a-c volts. Alternating-current voltmeters draw considerably more current from the line than d-c voltmeters. In fact it is not unusual to have a high grade portable a-c voltmeter of 150-volt rating require as much as 75 milliamperes for full-scale deflection. This gives an instrument resistance of approximately 2000 ohms, and a full-scale power consumption of about 11 watts.

Here we come to an interesting point. The series resistor of Fig. 12 contributes nothing to the torque of the instrument, since the torque is governed by the product of the ampere-turns of the fixed and moving coils. If we could wind the fixed and moving coil entirely of resistance wire, we could dispense with the fixed resistor normally used. This, however, is not practical, because of the large amount of power which would then have to be dissipated by the coil system. To obviate this difficulty, we wind the fixed and moving coils with copper wire. Then, to reduce the instrument error caused by change in the resistance of copper when the temperature is varied, we mask or "swamp out" the error by using sufficient series resistance of negligible temperature coefficient. It has been found that a satisfactory relation between copper resistance and swamping resistance exists when the copper resistance amounts to about 10 per cent of the total resistance of the instrument. In other words, in our 150-volt portable instrument previously described, the field and moving coils would have a combined resistance of about 200 ohms, and the series resistance would be approximately 1800 ohms, making a total of 2000 ohms.

If the full-scale voltage rating of the instrument is lowered, the resistance of the instrument, of course, must decrease. Also it is necessary to keep the copper resistance at about the same proportion, namely, 10 per cent. This limits the number of turns which we are able to wind on the fixed and moving coils. Hence, to get the same torque in the instrument, we must use more current, which means that the instrument may draw a very appreciable current from the line. For example, a 15-volt a-c instrument of the higher-grade portable type may draw as much as 250 milliamperes from the line.

To illustrate the effect of increasing the percentage of copper resistance, we would make an instrument which would require less current for full-scale deflection by using smaller-size copper

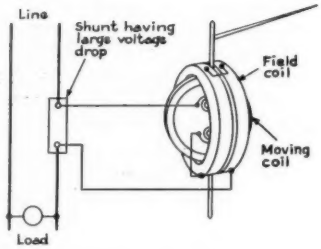


Fig. 13. One way to make a dynamometer ammeter to measure several amperes

wire on the fixed and moving coils, and by increasing the number of turns. However, the performance of the instrument under various conditions of ambient temperature might be quite poor. Suppose that instead of using 10 per cent or 6 ohms of copper in a 15-volt, 60-ohm instrument, we used 30 ohms copper and 30 ohms zero-temperature-coefficient resistance. Copper changes 0.4 per cent for each degree C change in ambient temperature; thus, if the temperature at which the instrument is used were increased 10 degrees, the resistance of the copper circuit would increase to 13.2 ohms, giving an instrument resistance of 61.2 ohms at this temperature. The instrument would then read 60/61.2 or only 98 per cent of the correct value when 15 volts were applied.

The foregoing assumption as to instrument indication does not take into account the change in elastic modulus of the instrument spring at this higher temperature. As a matter of fact, in most instruments the elastic properties of phospher-bronze spring material change in such a direction as to compensate partly for the error in indication caused by change in the copper resistance of the instrument.

Ammeter Principle

Instead of changing our milliammeter into a voltmeter by providing it with a series resistance, if we equipped it with a shunt, we could use it for measuring values of alternating current greater than 100 milliamperes. We would, however, run into some practical difficulties in applying this scheme if we used a shunt as shown in Fig. 13. The shunt would have a very high voltage drop at rated current to divert sufficient current through the ammeter element to obtain full-scale deflection. The milliammeter element would also have to consist principally of copper. As the ambient temperature increases, the amount of current flowing in the instrument element for any given line current would be lower. The inductance of the coils must also be considered. In order to overcome these difficulties, it is customary to send the full line current through the fixed coils of a dynamometer-ammeter, and to allow only the current for the moving element to be taken off the shunt, as shown in Fig. 14. This arrangement permits the use of some series resistance, and materially improves both the temperature coefficient and the time constant of the instrument. For the lower ratings, the shunt can be located within the instrument case.

(To be continued)

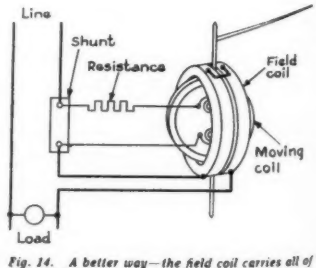


Fig. 14. A better way—the field coil carries all of the line current, and the moving coil carries a definite fraction of it

Odd Groupings for Lap-Wound Top-to-Top Connections

By A. C. Roe

This is the second of two articles discussing odd pole phase groupings. All of the tables referred to in this article were published in the October issue, copies of which may be obtained, as long as they last, by writing the editor.

●

IF THE MAIN formula N/G, where N is the number of coils and G is the number of pole phase groups, results in an uneven or fractional number, it is an indication that the winding will require odd coil grouping. The following example will demonstrate the procedure required:

First, assume that a winding is being designed for a 14 pole, three-phase, 96 coil stator. Then N=96 and G=42.

First, divide the number of coils (N) by the number of groups (G), which for 96 coils and 42 groups gives a result of 2 with a remainder of 12. This remainder of 12 indicates the number of pole phase groups that will have *one more coil* than that obtained as the first whole number answer. This remainder can be designated as "L" and termed the *number of large groups.*

The next step is to subtract L and G. This results in 30, in the example under consideration, which can be marked "S" as it represents the *number of small groups.* At this point we note that we will have 30 S-groups and 12 L-groups, with 2 coils in each S-group and 3 coils in each L-group.

In Tables A, B, C, D, and E, the two columns at the right show the number of large and small groups for each number of coils. This can be used as a guide for laying out the odd grouping of other combinations that have the same number of large and small groups. For example, in Table B, there are five lines that have the six small and twelve large number of groups. These are the lines for 48, 60, 84, 120, 156 coils, respectively. In Table B, there are six lines with twelve small and six large groups, which follow the same arrangement as the six small and twelve large groupings. This indicates the value and use of the "L & S ratio" in the tables and the arrangement of the pole-phase groups.

But for the 14 pole, three-phase, 96 coil example, the tables do not provide a guide. Therefore, we will have to work out a grouping. As shown in Figure 1, on cross section paper, three lines are layed out, one for each phase. The top or A-phase line starts with group 1 for pole 1. Then we add 3 to each succeeding pole-phase group until we have the proper number of A-phase poles. The B-phase line starts "1 and 3" groups behind the group 1, or in this case group 41. The C-phase starts "1 and 3" ahead of group 1, or on group 3. Fill out the table, then, as shown.

Next, divide the number of large groups or small groups, whichever has the smaller number of pole phase groups, into groups per phase. In this case 12/3 equals 4 large groups per phase. Next divide the number of groups by the number of L groups. In this case 42/12 = 3.5, so we can try a pitch

A-PHASE	1 X	4 X	7	10	13	16	19	22 X	25 X	28	31	34	37	40	
B-PHASE	41	2	5	8 X	11 X	14	17	20	23	26	29 X	32 X	35	38	
C-PHASE	3	6	9	12	15 X	18 X	21	24	27	30	33	36 X	39 X	42	
LINE D	1	4	8	11	15	18	22	25	29	32	36	39			
LINE E	2	3	2	3	2	3	2	3	2	3	2	3			
LINE F	3-22-3-222-3-		22-3-222-3-		22-3-222-3-		22-3-222-3-		22-3-222-3-		22-3-222-3-				

Figure 1. These diagrams illustrate Mr. Roe's method of determining proper arrangement of unequal coil groups in designing a winding for a top-to-top lap-wound induction motor. In this example, consideration is given to a 14-pole, 3-phase motor. The "A-Phase" line is filled in by starting with phase-group 1, and every third group following. The "B-Phase" line and the "C-Phase" line are filled in in a similar way. The motor in question has 96 slots. As explained in the text, it is found that each phase group will consist of two coils but 12 of the phase groups must have three coils each in order to fill the 96 slots. The problem is how to distribute these three-coil groups in order to obtain an electrically balanced winding. The groups selected as three-coil groups are indicated by an "X" under the phase group number in lines A, B, and C. Line D shows these groups in order. Line E shows how many of the two-coil phase groups are included between each of the three-coil phase groups. In Line F the number of two-coil groups between each three-coil group is indicated. This last line shows the actual order of the groups in the winding, that is, 3-2-2-3-2-2-2-3-2-2-3-2-2-2-3, etc.

of 1 and 4, and 1 and 5. Then in Fig. 1 start at 1 and add an X under group 1, then with a pitch of 1 and 4 add an X under group 4, then using a 1 and 5 pitch add an X under group 8 in the B phase line. Then with 1 and 4 pitch add an X under group 11, then with the 1 and 5 we will add an X under group 15 in the C-phase line. Then with pitch of 1 and 4 add an X under group 18. Then, a pitch of 1 and 5 puts an X under group 22 in the A-phase line, and so on until ending up on group 39.

Next lay out in one line with a space between the group numbers in which we have one extra coil as shown on line D, Figure 1. Then under this line, between the group number, add the number of groups that will accrue between each number as shown on line E, Figure 1. This line shows the spacing of the groups with the lesser number of coils. Then adding these small coil groups between the large ones as in line F, Figure 1, we have the final grouping arrangement.

In line F, we can check the number of large groups per phase using the 1 and 4 check, as all pole phase groups in any one phase are spaced 1 and 4 groups apart. In this case we can only have 4 groups of large coils in each phase. The check shows all phases correct. A further check shows that this grouping can be used for series and 2-parallel connections only.

Applying another check to Figure 1, for opposite poles, we find that groups 1 and 22 are on the halfway apart and that both have 3 coils. Likewise 4 and 25 are spaced 21 groups apart, the same applying to the other large coil groups. Thus we have a good balance.

The method of figuring as just described, along with Table I and auxiliary tables, A, B, C, D and E, provides the base for checking and laying out all types of odd groupings.

The total number of coils N should be divided by the number of phases P or N/P which should result in a whole number. If a fraction, then coils will have to be cut out for connections other than series. For example consider Table C, 8 pole, 3 phase, 62 coil line: 62/3 = 20-2/3 indicating that two coils must be cut out to obtain an equal number of coils in each phase.

A study of Table 1 reveals that where the number of coils per group is an even number for equal coil grouping, the grouping will also be equal and one-half the number of coils per group for double the number of poles. For example, compare lines 48, 72, 96, etc., with lines 60, 84, 108, etc.

Also consider Tables A and C for the 4 and 8 pole windings. Note that for the same ratio of large and small number of groups, that the group layouts are the same. For example, compare Table A, the 4 pole, 90 coil line, with 8-L and 8-S groups, with Table C the 60 coil line with 12-L and 12-S groups. In each case, the arrangement is the same.

A comparison between Tables A and C will also indicate how the grouping changes with the same number of coils for double the poles. For example, compare the 54 and 90 coil lines, etc.

The tables in this article will be found sufficient to cover the largest range of small and medium lap wound induction motor windings and will prove a time-saver for use in connection with the connecting diagrams published in the 1939-40-41 issues of ELECTRICAL SOUTH.

Staggered Units Solve Lighting Problem

By Howard L. Plahn

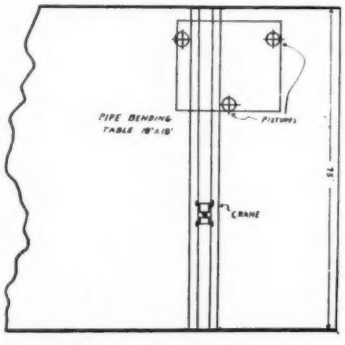
LIKE SO MANY plants that were designed for peacetime, daylight operation, the Texas Pipe Bending Co., of Houston, Texas, simply didn't have enough light to operate properly at night, as pressure of war demanded.

The main bending table area has four pipe bending tables about 75 feet apart. Overhead, 25 feet up, a traveling crane reaching from side wall to side wall, travels the length of the building. The old lighting system had four outdoor floodlights mounted above the crane, and seven eliptical 300-watt reflectors mounted lower on the supporting pillars. The result was glare from the low pillar fixtures at the sides, and not enough light from the high floods.

The remedy was furnished in a lighting layout by the Houston Lighting & Power Co. The plans called for 400-watt combination mercury vapor and incandescent fixtures with a high bay reflector to punch the light down from the 27 foot mounting height. Three of these fixtures were mounted above each table and staggered in such a manner that the crane would block the light of only one fixture at a time as it passed beneath them, thus avoiding an objectionable blinking effect were they in perfect alignment. The old high-mounted floods were left in and re-located to provide a general light for the remaining non-working area.

The mercury vapor fixture was selected because of low operating and low maintenance cost. And maintenance adds up to quite an item with a 27 foot mounting height, a bad dirt and soot condition, and janitors demanding $50 per week. Under these conditions, the fewer high intensity fixtures, the better.

The new lighting system furnishes thirty footcandles of good light, as compared to the old system of glare and shadows with four footcandles of light.



Plan view showing staggered units over pipe bending table which minimized the effect of shadows from the overhead crane.

Mercury Lamps Used In Navy Blimp Hangars

By H. M. Horton

ONE OF THE problems of the lighting industry today is to recommend that type of an installation which will conserve as much as possible of the so-called "critical" materials, such as iron, steel, copper, etc., and yet be able to do so without reducing the quality of light or the footcandle intensity required. Such a problem presented itself a number of months ago in the construction of some blimp hangars at a naval air base in the South. (Specific

Comparison of Relative Advantages of Incandescent and Mercury Lighting Systems For Naval Air Base Blimp Hangars
(Based upon Equal Lumens)

	Incandescent System	Mercury System	
Hangar Dimensions	240′ x 1,000′	240′ x 1,000′	
Spacing of Fixtures	6 rows—40′ x 40′	2 rows—100′ x 50′ along catwalk	
Number of Fixtures	150	32 (for equal lumens)	(21%)
Number of Circuits	150	32	(21%)
Fixtures (type & wattage)	1,500 High Bay Prismatic Glass	3,205 (transformer included) High Bay Porcelain	
Wattage in KW (Total)	225	103	
Total Cost of Luminaires	$4,080.00	$3,360.00 (much less now)	(82%)
Total Cost of Circuits ($50 per wired outlet)	$7,500.00	$1,600.00	(21%)
Total Cost of Lamps	$ 542.00	$ 830.00	(153%)
Initial Installation Cost	$12,122.00	$5,790.00	(48%)
Total Annual Cost (Operation, lamp renewals, depreciation, etc.)	$12,410.00	$6,675.00	(54%)
Lumens per Lamp	120,000	33,000	
Total Average Footcandles in Service	5	5	
Critical Materials in Pounds (excludes KW)	8,400.64 lbs.	5,862.415 lbs.	(70%)
Initial Installation Cost Per Million Lumens	$8,280.00	$3,980.00	(48%)
Total Annual Cost per Million Lumens	$8,540.00	$4,580.00	(54%)

location can not be disclosed.)

The hangars in question, which are similar to those constructed in other sections of the country, are dome shaped and approximately 160 feet high at the mid-point. They are about 240 feet wide, 1,000 feet long, and can house a double row of three blimps, or six in all. The original specifications called for lighting this area with six rows of 1,500-watt incandescent lamps in prismatic glass, high bay, reflectors—25 units per row. or a total of 150 units.

Upon analyzing the seeing requirements within the hangar, it was found that the quality of light as produced by the relatively new 3,000-watt, 120,000- lumens, H-9 mercury lamp would be perfectly satisfactory for the sort of work being carried on in this area. Furthermore, this mercury lamp, which is a linear light source of 54⅞ inches in length, is twice as efficient in lumens per watt as the 1,500-watt incandescent lamp, and equal in light output to approximately four of them. In addition, a 460-volt distribution system is required for its operation.

Taking the above factors in mind, we began to envision an H-9 mercury lamp lighting system in place of the initial incandescent specifications, which could save an appreciable amount of critical materials as a result of a reduction in the total number of fixtures and branch circuits required, and the smaller size wire utilized with the higher voltage.

Furthermore, the cost of cleaning and maintenance of the lighting equipment, which is a particularly acute problem in plants with unusually high ceilings, could be greatly simplified with the fewer units necessary in the mercury system.

As the analysis progressed, still more savings and advantages could be enumerated, such as lower energy consumption and total annual operating cost.

The following summary will present a clearer picture of the relative merits of the two lighting systems. Actually, 42 mercury units were installed to provide approximately 7 to 8 footcandles in service, rather than the 32 units as shown on the table. However, the table was prepared on the basis of equal footcandles to produce a more direct comparison. For obvious reasons the exact cost figures can not be given, but they should not vary too appreciably from those shown.

Holiday Gift Goods Keep Dealer Going

(*Continued from page 23*)

fancy), china of different sorts, glassware, cooking vessels, pottery, household items and a miscellany of goods, such as locks, razor blades, paints, glue, oil cloth, linoleum rugs, card tables, and sporting goods in limited quantities.

As he gets more and more into the new business, Mr. Johnson says it looks more and more attractive. However, he is not unmindful of the fact that he is primarily an appliance dealer and also that conditions may change at the close of the war. He handles such appliances as can be obtained and is giving close attention to his electrical repair shop.

When asked whether or not he will go back to an exclusive appliance store after the war is won, he said that he doubts it, because of the satisfaction of selling merchandise and getting the money for it in cash at the time of the sale and knowing daily approximately what profit he has made. This in comparison with selling large appliances and not knowing for 24 months whether or not an item was actually sold, having an old trade-in to deal with in almost every sale, and finally, realizing 5 per cent or less net profit when a deal is completed. So time will tell. Probably, he will get back into merchandising appliances on shorter and better terms and continue selling such merchandise for which there is a demand.

Wartime Code Problems Discussed

WITH MORE than 260 members and guests registered, the 15th annual conference of the Southern Section, International Association of Electrical Inspectors, was called to order in New Orleans on Monday, September 27, by president E. L. Muller, chief electrical inspector of New Orleans.

Scheduled early on the first morning's program, was the address by the international president of IAEI, Tom Bowry, of Richmond, Va., and charter member of the Southern Section. Mr. Bowry reviewed the organization of the IAEI and described the electrical inspections which started on October 19, 1881, when a board of fire underwriters of New York ruled that wires should be covered with some sort of insulation. He described the events that led to the formulation of the first electrical code in 1897. After almost 50 years of effort in building the Code, he said, the Code authorities are hampered now by war conditions which force them to partially set aside the Code for the duration.

Postwar problems, he pointed out, should be the first thing tackled by the association. He stated that a committee to study this problem had been appointed with representatives from all parts of of the country. Sales control ordinances, enforcement of codes, education of the public and inspectors, and civil service, were among the topics under study.

Southern Section President P. L. Muller, in his address, quoted the proclamation of President Roosevelt on fire prevention stressing the point that fire prevention is most important in war times.

President Muller then introduced the first speaker on the program, Lieut. Thomas, from the Office of Naval Officer Procurement. Lieut. Thomas expressed the need for men from the IAEI to fill various engineering positions in the navy. Men from 19 to 50 may apply and college degrees are not necessary, if the person has equivalent qualifications, in any of the 20 branches of the services.

Arthur L. Abbott was next to follow on the program with a paper entitled "War Time Manufacturing Problems." Mr. Abbott brought out that one of the most important of our problems in war time was the development in the field of lighting. He stated that only a few years ago we were well satisfied with illumination equivalent to 20-foot candles and today 50-foot candles would be a minimum.

Welding Machine Problem

Installation of electric welding machines was cited as another problem in these war times, although it was generally believed that electric welds will gradually replace the rivets after the war and that we can expect an excessive amount of welding machine problems.

Mr. Abbott favored the more general use of inherent overcurrent protection for small motors. Considerable discussion resulted at this point of the program and N. E. Cannady offered a resolution that electric motor manufacturers study the advantages of inherent protection. Secretary Tousley stated that such a resolution was not necessary as joint committees of the IAEI and NEMA are already studying this problem.

In answer to Mr. Welman's

at Southern Inspectors Conference

statement that the only good protection for small motors was that of inherent protection. Mr. Brandon stated that very good results have been obtained in some approved domestic refrigerators that do not use inherent protection but that the equipment used was part of the equipment assembly.

Estes W. McKinney made his report of the Membership Committee followed by a report of Chapters. The secretaries of the seven chapters read their reports. Three of the chapters failed to hold meetings during the year due to war conditions and transportation. International Secretary Tousley recommended, that at least one chapter meeting be held between section meetings.

The Monday afternoon session opened with Code panel discussions led by Frank Camus as chairman. The Code panel was composed of the following members: Arthur L. Abbott, New York City; L. F. Adams, Schenectady, N. Y., M. M. Brandon, New York City; J. G. Fisher, Jackson, Miss.; E. C. Knox, Miami, Florida; J. S. Mahan, Chicago, Ill.; F. Thornton, Jr., E. Pittsburgh, Pa.; G. M. Ross, Sheffield, Ala.; C. V. Porbes, New Orleans, La.; W. S. Stall, Jacksonville, Fla.; B. Z. Segall, New Orleans, La. and V. H. Tousley, Chicago, Ill.

Code Panel Discussions

Some of the problems presented to the Code panel were as follows:

(1) Discussion on installation of high tension electric fences particularly in cities where children are exposed to them.

Answer: It was generally agreed that the electric fence was not intended for installation within cities and such use should certainly be discouraged. It was also brought out that no casualties have resulted from listed controllers, therefore controllers that are not listed by Underwriters' Laboratories, Inc., should not be accepted.

(2) Should the use of cleats and/or knobs made of wood be considered as prohibited?

Answer: The use of cleats and/or knobs should not be made of wood and their use should be prohibited.

(3) (Section 3400) May general purpose open type motors be used in locations described in this section?

Answer: Yes, if protected by hoods or splash shields. The members were asked to read Section 4308 of the Code which apparently covers this class of location. One of the panel experts made a statement that any motor other than the brush type would operate indefinitely under water. It was further agreed by the panel experts that motors located in damp or wet locations should have their windings impregnated with some good water repellent.

The next speaker on the program was Lieut. Commander John J. Gidiere, of the U. S. Coast Guard. Lieut. Gildiere pointed out the close connection between the IAEI and "Port Security." He covered numerous hazards encountered on water front properties, the most serious of which was from electric welding. A fire watcher equipped with first aid fire appliances is required at each welding job regardless of size. The greatest loss from fire is mainly due to carelessness, negligence and haste.

(Continued on page 57)

NEWS of the INDUSTRY
National and Southern

Landers, Frary & Clarks' 'U' Plan for 'V' Day

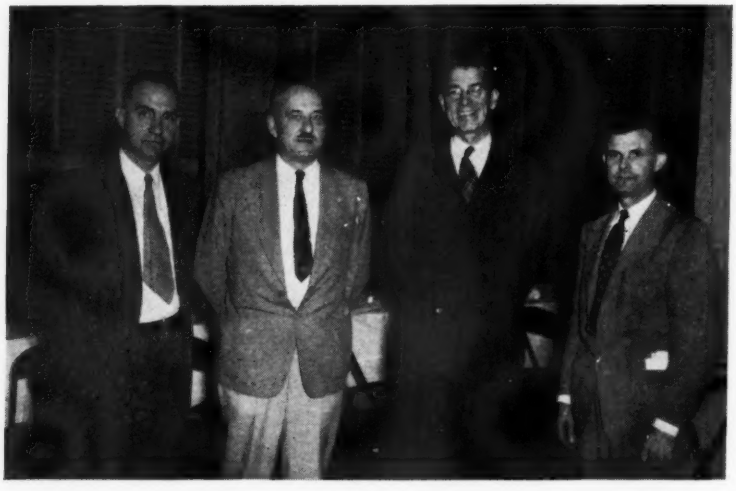
Although announced to the trade only last month the "U" Plan for "V" Day, Landers, Frary & Clark's unique plan for helping dealers prepare for postwar selling while helping their business now . . . has aroused considerable attention among distributors and dealers from coast to coast, according to reports received from Universal executives.

Brochures further explaining the plan are now being mailed to dealers throughout the country and daily hundreds of requests by wire, phone and mail are pouring into Universal distributors and the factory. Because of the interest created among the trade advertising schedules have been pushed ahead and arrangements are now being completed for a series of "U" Plan meetings from coast to coast.

A free point-of-sale promotion package will be ready for shipment in November and will be sent to all dealers tying in with the "U" Plan for "V" Day campaign.

This promotion kit is designed to identify each dealer with the national advertising and to assist him in telling the story of the "U" Plan for "V" Day to his customers. It contains nine cleverly designed sales helps which are based on the national advertising program. Such items as store banners, window displays, decalcomanias, counter cards, dealer-consumer check lists, newspaper mats and bond holders along with a consumer booklet are included in this assortment. The "U" Plan promotional kit is devised to help dealers tell the story in a simple, but effective manner at the point-of-sale.

A forceful 20 page "U" for "V" plan book explaining in detail the plan and showing the dealer how he can use the "U" Plan to best advantage will be issued to dealers this month. The "U" Plan for "V" Day Plan book introduces the reasoning behind the plan, indicates how the plan works in 5 easy steps shows 10 advantages to be gained by the dealer, outlines the national advertising program, illustrates the promotion package, shows the dealer how to tie-in the sale of war bonds, presents 6 easy steps to get the program underway and submits a series of questions and answers to clarify dealer thinking about the plan.



CHATTANOOGA LEAGUE ELECTS OFFICERS—Newly elected officers of the Chattanooga Electric League. Left to right, Herbert Haile, retiring president; Paul Ramsey, newly elected president; W. G. Davies, Jr., second vice-president; Paul McMillan, re-elected secretary. Frank Moore, first vice-president, and Paul Curtis, treasurer, were not present when the picture was made.

Indoor Climate Institute Organized at Cleveland

At a meeting held in Cleveland, recently, the Indoor Climate Institute was formally organized by leading manufacturers in the heating, cooling and equipment industries. The Institute has, as its primary purpose, a program for the improvement of heating and air conditioning in the interests of public health and greater indoor comfort. The Advisory Council to The Board, Board of Directors and Officers are prominent executives, representing every segment of the related industries.

The I. C. I. membership insignia will stand as a symbol of greater indoor comfort to the American public. The Institute, a non-profit corporation, will have its headquarters in Detroit. It will serve as a clearing house of information, set up with a central staff and committees qualified to conduct a broad program of public and trade education. The public will be informed as to the many benefits in health, comfort and economy resulting from properly designed and installed prime heating equipment —burning coal, gas or oil for warm air, hot water or steam heat.

With the inevitable postwar demands for summer cooling, as well as greater heating efficiency and comfort in winter, the program of education will clarify conceptions as to systems and methods which will assure truly air conditioned or cooled areas in homes, commercial

establishments, offices, public buildings and industrial plants.

The Indoor Climate Institute proposes the establishment of local chapters throughout the Nation. Membership in the local organizations will be composed of the various members of the trade, dealers and utility companies.

Many practical objectives have been set up for thet first year of operation for the Institute. A comprehensive study of manpower problems, now and for the postwar period is to be made. This will assist everyone in the heating and cooling industries to recruit and train personnel in the many specialized skills required in the manufacture, distribution and installation of central heating and cooling systems. Technical committees have been set up to study the codes, standards and practices, as established by the various industry trade associations and authorities for the benefit of the public.

The board of directors and officers of the I. C. I. are launching a membership drive immediately. The executive personnel has been elected, which includes the following: president, Paul B. Zimmerman, Airtemp Division, Chrysler Corporation, Dayton, Ohio; 1st vice president, T. A. Crawford, Timken Silent Automatic Division, Detroit, Mich.; 2nd vice president, E. N. Hunter, The National Radiator Co., Johnstown, Pa.; secretary, R. E. Moore, Bell & Gossett, Morton Grove, Ill.; treasurer, E. N. McDonnell, McDonnell & Miller, Chicago, Illinois.

WPB Revises Conduit Restriction Order

War Production Board Order L-225, regulating the manufacture, sale and installation of electrical conduit was amended October 1st in two important respects: (1) the rating required for the sale of conduit (except within the industry) is raised from A-1-j to AA5; and (2) rigid and "thin wall" conduit now may be used "to suspend an industrial lighting fixture." Previously, such use was authorized only with fixtures weighing 4 pounds or more.

OPA Bulletin Summarizes Stove Rationing Rules

Principal details of domestic stove rationing, which became effective on a nationwide basis on August 24, 1943, are contained in OPA Retailers Bulletin No. 42 just released by the OPA Department of Information.

Main points of the new program, as listed in the Bulletin are:

1. It covers the entire United States.

2. It includes practically all new domestic stoves (see the list in this Bulletin).

3. It provides a quota system through which all sections of the country may share the total supply equally according to need.

4. It provides that a purchase certificate (issued by a local Board) must be collected by the seller at *every* transfer of the new rationed stove, whether transferred by manufacturer, wholesaler, retailer, or any other person, except for transfers to or through exempt Federal agencies. The latter transfers are made on priority evidence.

More detailed information on stove rationing is available in the Trade Manual on Stove Rationing and in Ration Order No. 9A. Copies of both these publications are available at your local War Price and Rationing Board.

Half-Million Tubes Made Available for Home Radios

More than half a million radio receiving tubes for home radio sets were made available for users early in October by the Radio and Radar Division of the War Production Board.

A total of 576,613 radio receiving tubes is in the possession of the

NESCO Milwaukee Plant Awarded Army-Navy "E"

The Army-Navy "E" award for excellence in war production was presented to management and labor at the Milwaukee plant of National Enameling and Stamping Company, Thursday afternoon, September 23rd.

Shown are Col. J. C. Raaen, extreme left, who presented the pennant. Marshall Mercier, employee holding left end of pennant, who accepted the token lapel "E" pins for workers. E. R. Marter, snperintendent, center; and Alfred J. Kieckhefer, president of the company together with Commander M. A. Sawyer at right of pennant. Seven employees who accepted token lapel "E" pins appear pleased and happy about the occasion.

This is the second "E" award to be received by the National Enameling and Stamping Company. First to win the award was the Granite City, Illinois, division on May 26, 1943.

Phillips Export Corporation. These tubes had originally been held for export, but after discussions between representatives of the Foreign and Domestic Branch of the Radio and Radar Division and officials of the Phillips Export Corporation, it was decided that WPB would authorize sale of the tubes without restriction to the domestic market.

Distributors or dealers purchasing these tubes will be governed by Limitation Order L-265 in their resale. The authorization allows any person to receive tubes from the Phillips Export Corporation without restriction as long as they are to be used domestically.

These tubes are types that are generally used in home radio receiving sets. The number of tubes now available in the nation for maintenance and repair of household sets in below actual needs, and the release of these half million tubes is a step towards making more tubes available for civilian replacement uses.

Sylvania Expands Southern Distribution Facilities

The photographs reproduced here show interior and exterior views of the newly established warehouse facilities and divisional sales offices at Atlanta, Ga., of Sylvania Electric Products, Inc. Although the new warehouse facilities are playing an important part in expediting service and delivery to the important war industries of the southeastern area, they are part of Sylvania's program for greatly increased service for Sylvania distributors and jobbers.

According to recent announcement by Hugh Saussy, manager of the Southeastern Division, service in this area will be further expedited by the following special representatives: Ralph E. Turner, Jacksonville, serving the state of Florida, southern Georgia and Charleston, S. C.; W. W. Lancaster, Hattiesburg, Miss.; serving Mississippi, Louisiana and western Tennessee; W. L. Snowden, Chattanooga, serving Alabama and eastern Tennessee; and Chauncey W. P. Roby, Atlanta, serving the city of Atlanta and northern Georgia.

OPA Issues Rulings On Dealer Assembled Radios

New methods for figuring ceiling prices on assembled radios and phonographs have been put into effect by the Office of Price Administration. Highlights of the new regulation are given in OPA Retailers Bulletin No. 46. The new rules apply only to household radio receiving sets and phonographs assembled by distributors and dealers from parts which they have accumulated. The order does not affect sets assembled by manufacturers who were engaged in manufacturing of radios and phonographs prior to February 9, 1942.

The new methods are contained in Maximum Price Regulation No. 430, which became effective July 26, 1943.

The Bulletin points out five important rules:

"When you buy a set it must be tagged, and the tag must be on the set when you sell it.

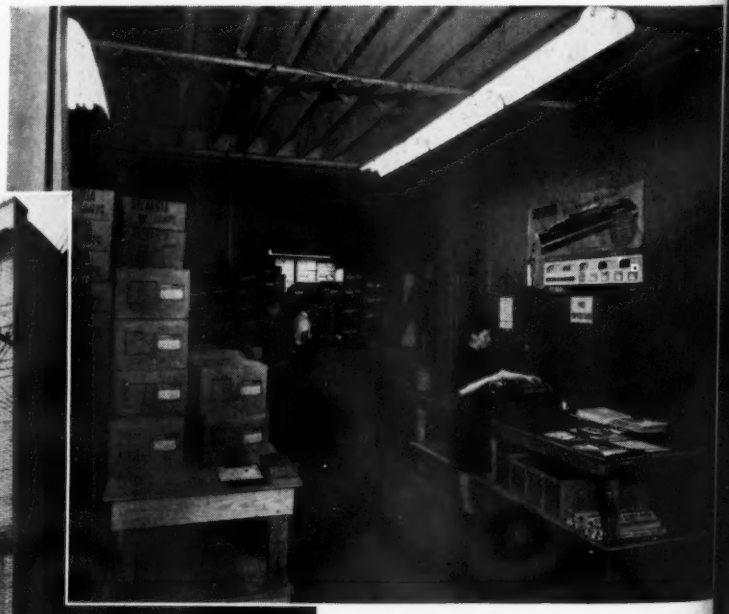
"Tags must carry the assembler's stock number, the ceiling price, and the statement of guarantee.

"Proper labels must be attached to all sets when you buy them and when you sell them.

"Be sure that you pay no more than the assembler's ceiling price when you buy a set, and that you charge no more than your own ceiling price when you sell it.

"For your records keep an invoice describing every purchase that you make of an assembled set, and keep a copy of every sales slip or receipt that you give to customers when you make a sale."

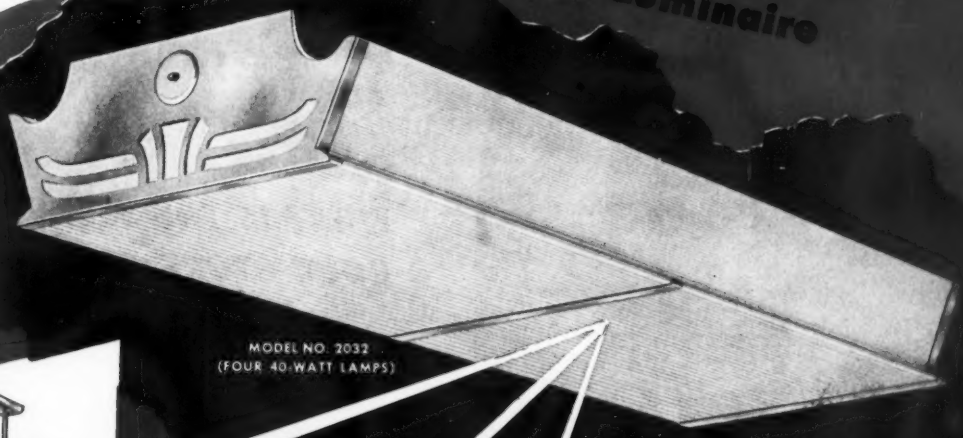
Other points emphasized in the Bulletin are:

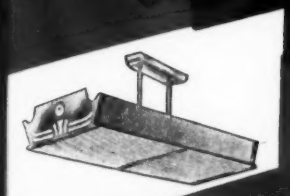


"The Regulation does not apply to units which assemblers delivered to retailer prior to July 26, 1943. If you have such a set in your inventory, your ceiling price for it

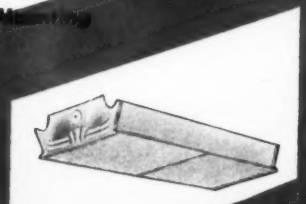
Ready to Deliver

New Improved Mitchell U.R.C. Research Luminaire

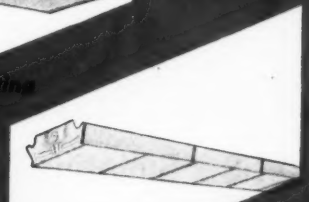




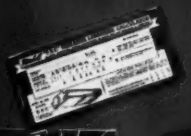
Pendant Mounting



Ceiling Mounting



Continuous Row Mounting



Designed in Accordance with Latest WPB Regulations

The famous U.R.C. Research Luminaire, originally introduced by **MITCHELL**, was so ideal for commercial lighting, it soon broke all sales records. NOW—a new improved model is available again for stores, offices, buildings and institutions—on a priority of A-1-J or higher—at the same original low price! It has all the original U.R.C. lighting benefits. Combines the ultimate in high intensity illumination with lowest surface brightness (glare). Adaptable for every type of interior—Pendant or surface mounting, individual or continuous rows. Requires less time to install than any other commercial fixture. Lightweight—less than 6 lbs. of metal! Delivery after December 1st—Place your order now!

Free

Send for Complete Brochure and Lighting Calculator

Write your Mitchell Distributor or to us for full details on the U.R.C. Research Luminaire—and for handy lighting "Calculator" which quickly determines the number of fixtures needed for desired maintained footcandles in a given area!

MITCHELL *Manufacturing Company*

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MITCHELL
FLUORESCENT

IN THE POSTWAR ERA CAN I HAVE A STORE THAT SELLS?
IS MY LOCATION GOOD FOR POSTWAR BUSINESS?
WHAT IS THE SECRET OF GOOD STORE ARRANGEMENT?
HOW CAN I ADVERTISE AND BRING THOSE CUSTOMERS IN?
The First Six Bulletins in the Hotpoint Series Unlock Many Secrets of Successful Merchandising
Planned Electrical Merchandising
1 "Plan Now for the Appliance Store that Will Help You Sell"
2 "How to Choose a Good Location for an Appliance Store"
3 "Planning Your Type of Electrical Store"
4 "Stocking an Electrical Appliance Store"
5 "Floor Arrangements Which Help You Sell"
6 "Advertising to Bring Them into the Store"
SCRAP
POWER

How Retail Merchants Can Plan Now for *Better Postwar Business*

Now is the time to plan for a better future in the merchandising of electrical appliances.

Hotpoint is doing something about that future *now!* We have in preparation a series of bulletins entitled, "Planned Electrical Merchandising." They are full of ideas and information that will give you a big edge in the postwar era.

These bulletins are about *your* business. *Your* store, *your* customers right in *your* community — not about Hotpoint products. They are loaded with practical, field-tested suggestions that will help any merchant improve his business volume.

Arming for Peace

The retailer who is best prepared with sound knowledge about store location, the secrets of display, making customers buy, and such, will take postwar business like the Yanks took Tunisia. It is the purpose of Hotpoint's new service for retailers to provide you with this ammunition.

Hotpoint is not waiting till the war is over to put this extraordinary material into your hands. The first issue of "Planned Electrical Merchandising" is ready now. This is tailor-made for postwar retail planning — with it you can plan now for better postwar business. Be sure to get the first issue of "Planned Electrical Merchandising." See how easy the ideas are to understand. Note how readily they can be applied. Observe how the use of this material can put you in the front ranks of the postwar march to greater business.

Write today on your own letterhead and ask for your copy of "Planned Electrical Merchandising."

Edison General Electric Appliance Co., Inc.
5614 West Taylor Street, Chicago 44, Ill.

FOR OUTSTANDING ACHIEVEMENT IN WAR PRODUCTION

LECTRIC Hotpoint KITCHENS

FRIGERATORS · RANGES · WATER HEATERS · WASHERS AND IRONERS · CLOTHES DRYERS · AUTOMATIC DISHWASHERS · ELECTRASINK · STEEL CABINETS

must be determined in accordance with the General Maximum Price Regulation.

"Your ceiling price for a set assembled by a distributor or another dealer will be shown on the assembler's tag attached to each radio or phonograph covered by the Regulation. When selling such sets you will have no figuring to do. The Federal excise tax will be included in the price shown on the tag. Make sure that such a tag is attached to each assembled radio receiving set or phonograph delivered to you. Remember, it is illegal to sell the article without the assembler's tag attached.

"The assembler computes *the ceiling price you may charge* by adding to his unit direct cost of material and labor an amount equal to 122 percent of such cost. The assembler then adds the Federal excise tax and adjusts the total to the nearest quarter of a dollar. The adjusted figure is your ceiling price.

"The ceiling price which the assembler may charge when he sells you one of these radios or phonographs is the amount figured above before adding the Federal excise tax, less 40 percent. The assembler then adds the tax as a separate item on his invoice to you. Please keep in mind that the Federal excise tax is included in the price shown on the assembler's tag. You must not add the excise tax. And the ceiling price shown on the tag must not be changed."

New Unit in Operation At Georgia's Plant Arkwright

Plant Arkwright, namesake of Georgia Power Company's president, and newest addition to the company's chain of electric plants, was dedicated at a special celebration on October 6th. Just completed, the third 40,000 kilowatt unit of the modern steam electric generating plant was officially put in operation on the company's system by President P. S. Arkwright with government officials and prominent citizens of Georgia looking on.

Present as Mr. Arkwright started the unit going were Robert H. O'Brien, member of the Securities and Exchange Commission, of Philadelphia; Justin R. Whiting,

Stirring Bond Rally At Universal Plant

One of the most stirring war bond rallies held during the "Back the Attack" campaign was staged at Landers, Frary & Clark when 3,000 Universal employees gathered to observe a demonstration of army searchlight, anti-aircraft and machine gun units in action.

Following this spectacular show, individual bond rallies were held in various departments throughout all Universal plants featuring a local sailor recently returned from Sicily, a WAC, and the co-chairman of the local drive. W. J. Cashman, newly appointed director of promotion and publicity for the company, was master of ceremonies. Over 120,000 dollars in war bonds were purchased by employees within a few hours after the rally and workers returned to their jobs with renewed vigor to produce the products of war.

McGraw Electric Personnel Receives Army-Navy "E"

Grouped back of the "E" banner in the foreground are, left to right, Rear Adm. Alex M. Charlton; Max McGraw, president of McGraw Electric Company; Commdr. Miles H. Hubbard; D. Scott Campbell, executive vice-president of the McGraw Electric Company; Murray Ireland, vice-president in charge of manufacturing, Capt. Robert Henderson, USN, who made the presentation of the "E" flag, and Lt. Col. A. B. Pattou, who presented the eight "E" pins. At the far left is Lt. C. R. Shipley, USN, and at the far right, Frederick V. Dellar, who accepted "E" pin awards in behalf of his fellow employees. Others pictured in the background include Margaret R. Gemmell, Mildred P. Campbell, Walter C. Lindoerfer, Lucille C. Pilcher, Gladys V. Anderson, D. Harold Dowden and Raoul C. Junod, McGraw workers who were formally presented their "E" pins.

CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE
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ELEC

VARNISHED CAMBRIC • RUBBER POWER CABLES • BUILDING WIRE • RADIO WIRES • SIGNAL CABLE • FLEXIBLE CORDS • LEAD • ENCASED AND PARKWAY CABLES • ARMORED CABLE

CRESCENT

Electrical Wires and Cables

Are Meeting Today's Special Needs

For war housing, industrial wiring and interior wiring of all kinds.

"CRESFLEX" Non-Metallic Sheathed Cable

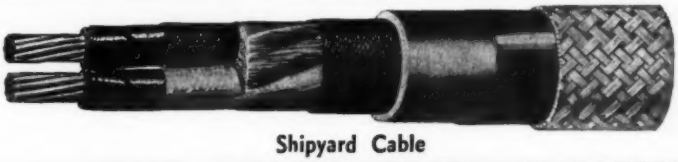
Extensively used in shipyards, and for the manufacture of tanks, guns and planes.

Welding Cable

For heavy duty portable power leads to drills, tools, welding and construction machinery. Oil resistant.

"IMPERIAL" Neoprene Jacketed Portable Cable

For electric power and control circuits aboard ship.



Shipyard Cable

For general industrial power wiring. Widely used because no rubber required in construction, and can carry larger currents for same size copper conductors.

Varnished Cambric Power Cable

CRESCENT INSULATED WIRE & CABLE CO.

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Paul Hogan, Jr.
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CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE

CRESCENT ENDURITE SUPER-AGING INSULATION • WEATHER-PROOF WIRE

president of the Commonweath and Southern; E. A. Yates, vice-president, and C. W. Mayott and Frank Nitzberg of the War Production Board, with W. E. Mitchell, vice-president and general manager, serving as master of ceremones.

Mr. Arkwright pointed out that the company's rates were uniform for rural and city communities. He stressed the fact that every community with as many as 250 persons has electric service and that 234 communities of less than 350 population also have the service. He was proud, he said that the company served 61,000 electric customers on individual farms and that of the 563 towns served 80 per cent have less than 1,000 population.

The first of the three 40,000 kilowatt generating units was placed in operation in June, 1941. The second, work on which progressed simultaneously with that on the first, was added to the Company system in May, 1942. The third unit was completed early in September and placed in preliminary operation on September 17.

44-Hour Week Adopted By Florida Power and Light

To meet increasing manpower problems and to reduce the use of gasoline and tires, the Florida Power and Light Company, on October 13th, through H. E. Simpson, vice-president, announced that beginning October 16th all departments will go on a 44-hour week.

In the electrical distribution and transmission departments the personnel will alternate on a 40-hour week one week and 48 hours the next. Formerly the employees were on a straight 40-hour week. The change will affect 1,313 employees in the state.

Mr. Simpson said the company has lost approximately 800 employees from the normal peacetime payroll of 2,000 persons. Women are being employed in both the offices and in the plants to take the place of men called to the armed forces.

Alabama Lighting Men Get Gold Bomber Awards

W. V. Guy and E. D. Scott, industrial engineers of the Birmingham Electric Company, were awarded the national gold bomber lapel pin and presented with Certificates of Merit in recognition of outstanding service to the war production effort in the Birmingham area at a dinner held at the Molton Hotel in Birmingham recently. Lighting installations in war industries that have enabled workers to increase their productive capacities earned for both these engineers the highly prized awards.

In making the official presentation to Mr. Guy, Lt. Col. J. E. Getzen, executive officer of the Birmingham Ordnance District, comprising four states besides Alabama, urged the necessity for redoubled efforts on the production front.

"With victories in the field on every hand, there is danger of over confidence and complacency," he cautioned. "Our hardest battles are ahead of us. The need for fighting materials is greater than ever before."

Conferring similar honors on Mr. Scott, Elmer Corum, industrial specialist of the War Production Board, emphasized that the awards were reserved for a select group.

In addition to the presentation addresses by Lt. Col. Getzen and Mr. Corum, informal talks were made by T. W. Moore, of Atlanta, Ga., manager of the Southeastern Division lamp department, General Electric Company, and C. E. Oakes, president of Birmingham Electric Company, and Jefferson County chairman of the Committee for Economic Development.

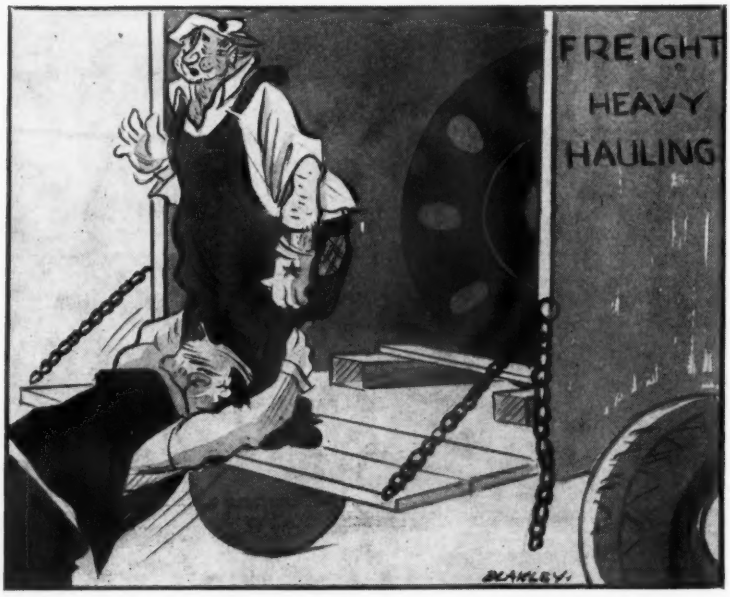
Postwar Prospects Subject Of Richmond League Meeting

J. G. Holtzclaw, president of the Virginia Electric & Power Company, addressed a meeting of the Electrical League of Richmond, in Richmond, on October 11. His subject was "Postwar Prospects for the Electrical Industry." Boyd A. Propert, chairman of the program committee, announced that speakers for future meetings would include C. B. Peck, Jr., of the Anaconda Wire & Cable Company, on November 8, and Davis M. DeBard, vice president of Stone & Webster Service Corporation, New York, on December 13.

Salvage Manual Published For Industrial Operations

The first comprehensive practical manual on industrial salvage ever prepared has just been published by the Technical Service Section, Industrial Salvage Branch, Salvage Division, War Production Board, and is now being distributed to industry.

The new book, entitled "Salvage Manual for Industry", contains 245 pages of systematically organized



"I know you're glad to get your motor, Mr. Bonsib, but honestly I didn't have nothing to do with it!"

HOW BIG IS TAPE?
How big is tape? Just as big as the broken wire it restores to service on the battlefronts... or the tank, plane or ship it helps to build. Big enough for it to be important that the Armed Forces and the War Industries have first call on our production of U.S. Friction and Splicing Tape.
A single roll of tape is a very little thing. But it takes millions of rolls of tape to splice electrical connections in our jeeps, tanks, ducks, fighters, bombers, PT-boats, anti-aircraft batteries. Remember, too, that Security Friction Tape is on the job in acres-big bomber plants, shipyards, foundries, steel mills, munitions works.
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SECURITY ON ALL FRONTS

3 Electrical Huskies

to handle every light and power job

BUStribution DUCT for Flexible Power

Built in standard, interchangeable 10-foot sections, BullDog BUStribution DUCT provides *complete flexibility* for power and lighting circuits — enables you to change production lines at will—rearrange whole departments without interrupting production elsewhere.

BUStribution DUCT is an integral part of the machines it serves. It is quickly and easily installed—100% salvable.

(Conforms fully with WLB Limitation Order L-273)

INDUSTRIAL TROL-E-DUCT for Feeding Portable Tools

With Industrial Trol-E-Duct, the source of power moves along with the tool—cutting operating cost, eliminating interruptions due to fixed plug-in points, increasing both safety and productive time, and making extensive savings in wiring and other fixed equipment.

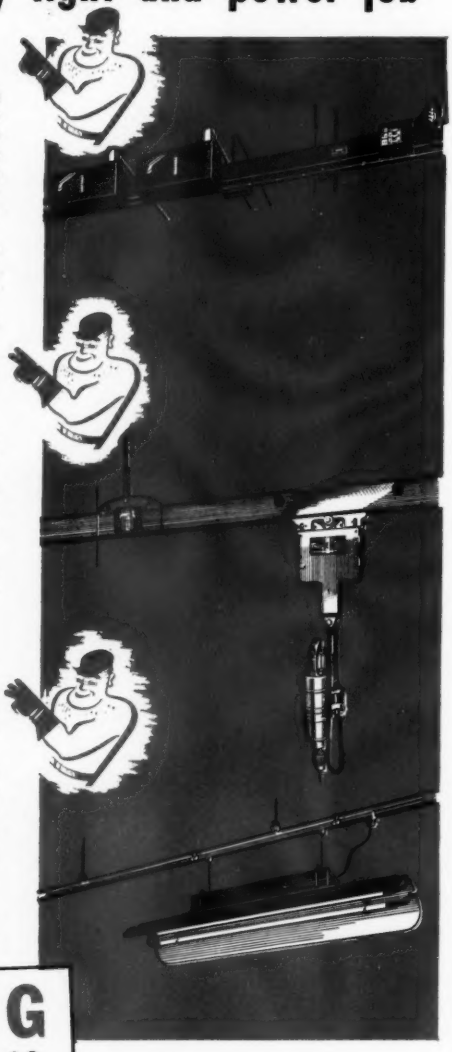
A fully descriptive bulletin will be sent on request.

UNIVERSAL TROL-E-DUCT for Flexible Lighting

What Industrial Trol-E-Duct is to power, Universal Trol-E-Duct is to lighting — a flexible system of quickly *movable outlets.*

Universal Trol-E-Duct puts light where it belongs — close to the work. It enables you to meet instantly any change in your lighting set-up or requirements, simply by moving lights along the duct or by adding new lights where needed.

Ask for full information about these and other BullDog products.



BULLDOG
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Detroit 32, Michigan
BullDog Electric Products of Canada, Ltd., Toronto, Ontario
Field Engineering Offices in All Principal Cities

MANUFACTURERS OF a complete line of Vacu-Break Safety Switches, Panelboards, Switchboards, Circuit Master Breakers and BUStribution SYSTEMS.

You SAVE What You SPEND for WAR BONDS

and classified information and data—most of it of a "how-to-do-it" nature—on industrial salvage practice in all its ramifications. Material is presented in 26 chapters, grouped into 6 major sections. There are 2 chapters on organizing and planning the salvage department; 3 on the administrative factors; 12 on methods of handling (finding, identifying, segregating, collecting, reclaiming, storing, selling, etc.) metal scrap; 3 on nonmetallic waste; 7 case histories demonstrating exemplary practice; a 17 page compilation of practical hints for handling specific waste materials; and a 9 page index.

Copies of the manual are available at 50 cents per copy through the Superintendent of Documents, Government Printing Office, Washington, D. C.

Army-Navy "E" Renewed At Hazard Wire Works

The Hazard Insulated Wire Works, Division of The Okonite Company has received its second six-month renewal of its Army-Navy "E" for continued production excellence in manufacturing electrical wires and cables for the armed forces.

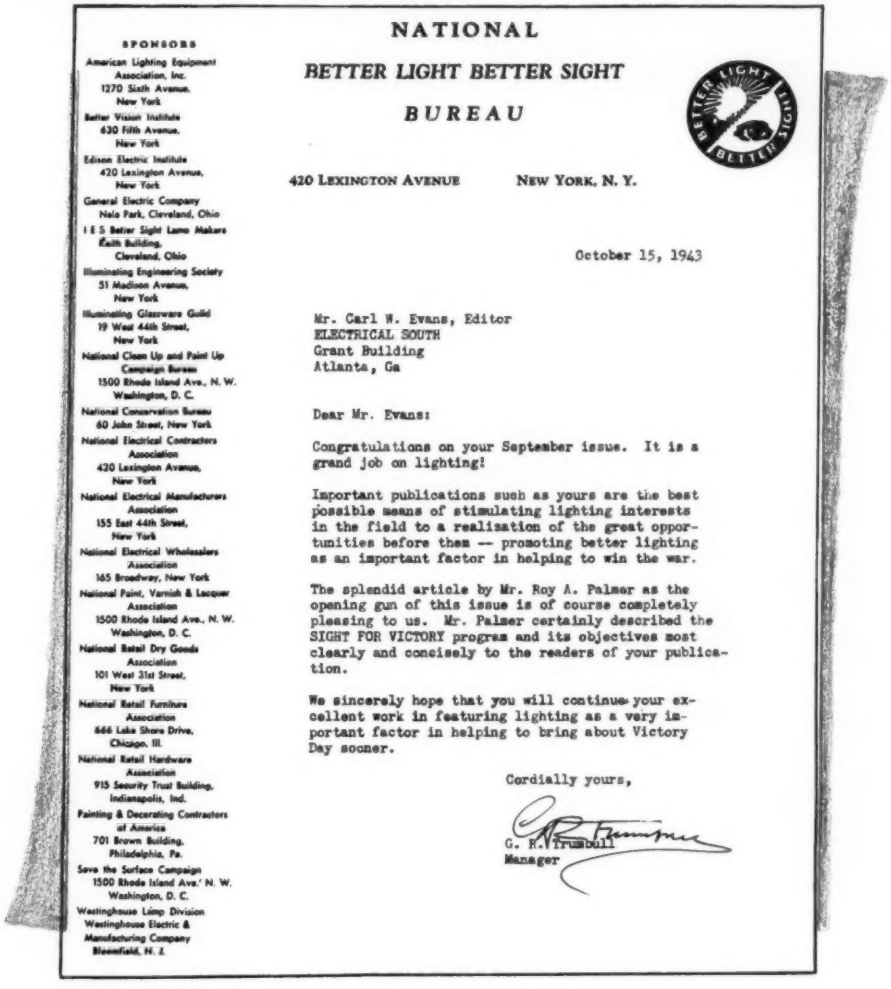
Suspended Housing Projects To Get Postwar Priority

Low-rent housing projects suspended during the war will be given prior consideration in any publicly-financed program authorized by Congress after the emergency is over, according to Herbert Emmerich, Commissioner of the Federal Public Housing Authority.

He said that applications for other Federally-aided projects for post-war construction would be accepted by FPHA regional offices but pointed out that authority must be granted and funds made available before any action can be taken.

Projects are to be accepted for review by Regional Offices, Mr. Emmerich said, only where the local housing authority states: (a) That such projects will be consistent with a sound public housing program for the locality, and (b) That such projects could be put under construction promptly after loan funds, contributions and permanent materials are available, but not more than two years thereafter.

THANK YOU, MR. TRUMBULL



NATIONAL

BETTER LIGHT BETTER SIGHT

BUREAU

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1270 Sixth Avenue,
New York

Better Vision Institute
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New York

Edison Electric Institute
420 Lexington Avenue,
New York

General Electric Company
Nela Park, Cleveland, Ohio

I E S Better Sight Lamp Makers
Keith Building,
Cleveland, Ohio

Illuminating Engineering Society
51 Madison Avenue,
New York

Illuminating Glassware Guild
19 West 44th Street,
New York

National Clean Up and Paint Up Campaign Bureau
1500 Rhode Island Ave., N. W.
Washington, D. C.

National Conservation Bureau
60 John Street, New York

National Electrical Contractors Association
420 Lexington Avenue,
New York

National Electrical Manufacturers Association
155 East 44th Street,
New York

National Electrical Wholesalers Association
165 Broadway, New York

National Paint, Varnish & Lacquer Association
1500 Rhode Island Ave., N. W.
Washington, D. C.

National Retail Dry Goods Association
101 West 31st Street,
New York

National Retail Furniture Association
666 Lake Shore Drive,
Chicago, Ill.

National Retail Hardware Association
915 Security Trust Building,
Indianapolis, Ind.

Painting & Decorating Contractors of America
701 Brown Building,
Philadelphia, Pa.

Save the Surface Campaign
1500 Rhode Island Ave.' N. W.
Washington, D. C.

Westinghouse Lamp Division
Westinghouse Electric & Manufacturing Company
Bloomfield, N. J.

October 15, 1943

Mr. Carl W. Evans, Editor
ELECTRICAL SOUTH
Grant Building
Atlanta, Ga

Dear Mr. Evans:

Congratulations on your September issue. It is a grand job on lighting!

Important publications such as yours are the best possible means of stimulating lighting interests in the field to a realization of the great opportunities before them — promoting better lighting as an important factor in helping to win the war.

The splendid article by Mr. Roy A. Palmer as the opening gun of this issue is of course completely pleasing to us. Mr. Palmer certainly described the SIGHT FOR VICTORY program and its objectives most clearly and concisely to the readers of your publication.

We sincerely hope that you will continue your excellent work in featuring lighting as a very important factor in helping to bring about Victory Day sooner.

Cordially yours,

G. R. Trumbull
Manager

FOR YOUR COMPLIMENT!

We are glad that you like our Annual Lighting Issue, but we won't take all the credit. The lighting men of the South—who have worked unceasingly to improve working conditions, reduce hazards, and increase war production, through your Better Light–Better Sight Program —must take a bow with us, for it was their splendid cooperation that made this issue possible. Again, we thank you—and them!

ELECTRICAL SOUTH

Atlanta *Georgia*

PERSONAL NOTES
About Men You Know

The Board of Directors of the Edwin L. Wiegand Company, manufacturers of Chromalox electric heating units, at their annual meeting on October 8, 1943, elected **E. N. Calhoun,** president of the company. **Edwin L. Wiegand,** who founded the company 28 years ago, becomes chairman of the board. **A. P. Wiegand** was elected senior vice president in charge of manufacturing.

E. N. Calhoun

Mr. Calhoun joined the company in 1922 as a salesman and has held the offices of treasurer and general sales manager. The Edwin L. Wiegand Company is said to be the largest exclusive manufacturer of electric heating units and equipment in the country and maintains engineering representatives in 25 principal cities throughout the United States.

* * *

W. A. (Art) Grove, for 15 years director of advertising and sales promotion, Edison General Electric Appliance Company (Hotpoint), Chicago, has joined the firm of Addison Lewis & Associates, Minneapolis advertising agency, as an account executive for Minneapolis-Honeywell Regulator Company, and other accounts. Before going with Hotpoint, Mr. Grove was connected with the Curtis Publishing Company, as advertising sales representative for the *Saturday Evening Post.*

W. A. (Art) Grove

"Art" Grove is widely known throughout the home appliance industry because of his active participation in association and industry promotional activities. He has twice served as chairman of the Plan Committee of the Modern Kitchen Bureau and for five years was chairman of the Advertising Committee of the Electric Range Section of NEMA. He is also a former director and vice chairman of the Association of National Advertisers.

* * *

Bernard H. Sullivan, one of the electrical industry's well known sales executives, has joined the general sales staff of G. E. Lamp Department, it was announced at Nela Park headquarters recently.

B. H. Sullivan

A native of St. Louis, Mr. Sullivan received his early education in that city and attended St. Louis University. For several years he was connected with the Commercial Electrical Supply Corp., of St. Louis.

In 1922, he joined the sales staff of Westinghouse Electric & Manufacturing Company, in St. Louis, and was associated with the lamp department of that concern until recently. He held the post of assistant sales manager of the New York division for three years, was advanced to district manager of the lamp division's south-western division in 1931, was made manager of the middle-west division, Chicago, in 1938, and was elevated to position of general sales manager of the concern in 1940.

* * *

Landers, Frary & Clark, nationally prominent electrical appliance and housewares manufacturers has announced the appointment of **William J. Cashman,** well-known merchandiser in the electric appliance field, as director of promotion and publicity.

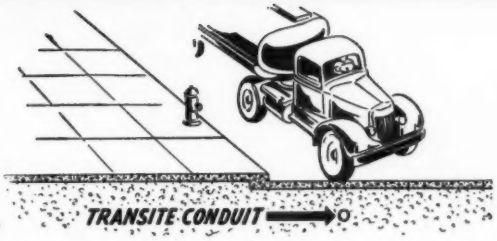
W. J. Cashman

Born in Salem, Mass., Mr. Cashman received his elementary and high school education in Asbury Park, N. J. Later he was employed by the Bethlehem Steel and Westinghouse organizations in their manufacturing operations.

Then in 1924 he entered Brown University where he specialized in marketing, graduating with a B. A. Degree in 1928. He immediately entered the employ of the Associated Gas and Electric System where he rapidly progressed through many phases of merchandising with this organization. He

WHY *TWO TYPES* OF *TRANSITE DUCTS?*

For Use Without a Protective Envelope . . .



Transite Conduit saves on labor and material, for it is so strong it needs no protective casing. It maintains its strength and true form under heavy earth loads and traffic pressure. Can't rot . . . effectively resists soil corrosion, smoke and fumes.

For Use With a Protective Casing . . .

Transite Korduct is thinner walled, lower priced, otherwise identical with Transite Conduit. Its long lengths mean fewer joints, fewer spacers. And its unusually high rate of heat dissipation lowers cable operating temperatures, boosts system capacity.

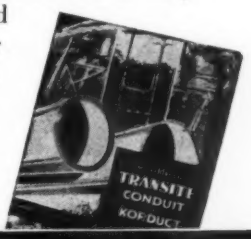
BOTH THESE DUCTS PROVIDE THESE ADVANTAGES AS WELL . . .

1. Minimize fire hazard—Transite Ducts cannot burn because they are made of asbestos and cement. They will not contribute to the formation of explosive or combustible gases.

2. Eliminate electrolysis problem—Inorganic and non-metallic, Transite Ducts can never be affected by electrolytic action.

3. Make cable pulls easy—The smooth bore of Transite Ducts speeds up cable installation. Because the ducts stay smooth in service, cables can be removed and replaced at any time with virtually no damage to sheathing.

4. Save time on installation—Light in weight, supplied in long lengths, Transite Ducts are so easy to assemble that only the minimum of time and expense is required for any job. Write for Data Book DS-410, Johns-Manville, 22 E. 40th St., New York 16, N. Y.



Johns-Manville

TRANSITE DUCTS

TRANSITE KORDUCT— for installation in concrete

TRANSITE CONDUIT— for exposed work and installation underground without a concrete encasement

WHEN OUNCES FEEL LIKE POUNDS

*Reg. U. S. Pat. Office

1230 SIXTH AVENUE
ROCKEFELLER CENTER, NEW YORK

UNITED

NDS...ASSAULT TROOPS USE LAYTEX*

You know how it is. You slog along all day under full equipment. At first you don't mind the weight very much. But as the hours crawl along, everything you're toting gets heavier and heavier. The canteen you didn't notice in the early stages now weighs as much as your rifle did then. And your rifle feels like a howitzer. Every ounce turns into a pound.

That's why . . . when you're moving fast and the going is tough . . . it's smart to use Laytex Assault Wire.

A full mile of Laytex Assault Wire weighs less than 30 pounds.

Laytex Assault Wire has a breaking strength of 50 pounds per conductor and a talking distance of more than 5 miles.

Laytex resists concussion and a wide range of temperature changes.

It is flexible and waterproof, strong and tough.

Conductors are accurately centered and the weight of insulation and the diameter of the insulated conductor are kept at the minimum.

All this adds up to the fact that one man, wearing a breast reel of Laytex Assault Wire can move swiftly and easily. One man can maintain sure communication with operational headquarters.

Listen to the Philharmonic Symphony program over the CBS network Sunday afternoon, 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.

STATES RUBBER COMPANY

successively held the positions of district sales manager and division promotion manager and manager of public relations.

In 1931 when legislative pressure in the country was directed at utility and chain store merchandising he collaborated in the development of the first successful cooperative merchandising plan for utility companies and was presented with the Davidson Award given by the Electrical Industry for outstanding merchandising achievement.

In 1934, he resigned from the utility system to become refrigeration sales manager for Landers Frary & Clark. In 1937 he was made sales manager of the Electric Range Division and in 1938 he was advanced to the position of sales promotion manager for the entire line of household products manufactured by the concern.

In his new position Mr. Cashman will have full charge of all research, promotion and publicity for the company. He has just completed the "U Plan for V Day," a program aimed at dealer-consumer post war planning which is being announced to the appliance and housewares trade this month, by the Universal concern.

* * *

Chauncey W. P. Roby has been added to the sales staff of the Southeastern District, Sylvania Electric Products, Inc., according to announcement by **Hugh Saussy**, southeastern district manager.

Chauncey W. P. Roby

Mr. Roby will represent Sylvania in the city of Atlanta and the immediately surrounding area. Although a native of Saginaw, Michigan, Mr. Roby has been in the South for the past few years serving the War Public Works Agency of the Government. His work with this agency has brought him into close contact with war plant construction throughout the southeastern territory.

* * *

When **George T. Marchmont**, southern district manager for Graybar Electric Company, entered his Atlanta office on the morning of September 22, he was greeted by Graybar employees of Atlanta who had gathered to offer their congratulations on his 35th anniversary of service with the Graybar organization, and to present him with the company's distinctive service button. Of particular interest is the fact that all of Mr. Marchmont's many years of service with Graybar have been in the South. Following his graduation from Georgia School of Technology, he started work at the Atlanta branch on Sept. 22, 1908. After three years, he was transferred to the Richmond branch where he served 15 years. In 1926, he returned to the Atlanta branch as southern district manager, where he has served up to the present time.

* * *

J. Milton Moore, southeastern division sales manager, at Atlanta, for National Electric Products Corp., passed away October 14, as the result of injuries he sustained in a traffic accident.

Although a native of Memphis, Tennessee, Mr. Moore had made his headquarters in Atlanta for more than 12 years. Previous to that, he was located in Pittsburgh. He had been associated with the National Electric Products Corp. for approximately 23 years.

Mr. Moore was well known throughout the South and took an active part in meetings of contractors, electrical inspectors, electrical wholesalers, and the Southeastern Electrical Manufacturers Representatives Club.

NEW EQUIPMENT and MATERIALS

Industrial Refrigeration Booklet

Controlled temperature, humidity and air cleanliness mean uniform quality, precision, fewer rejections and faster production, according to a new booklet on air conditioning and industrial refrigeration announced by Westinghouse Electric and Manufacturing Company.

In machining work, optical goods grinding and assembly, flying suit storage, instrument assembly, citrus fruit concentration, spot welding, X-ray film developing, capsule manufacture, airfield traffic control and other industrial processes, the booklet shows how air conditioning and industrial refrigeration solves production problems.

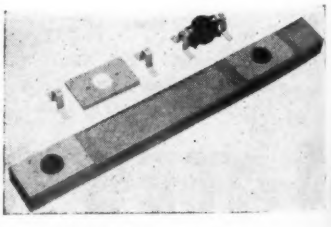
This 20-page booklet illustrates and describes the exclusive Hermetically-sealed Compressor, and traces its development from the 1932 models up to the present design. It also includes explanations and diagrams concerning the principles of air conditioning, and illustrates the complete line of Westinghouse equipments for air conditioning and industrial refrigeration, including models from 1 to 100 hp.

A copy of booklet 3AC-0201 may be obtained from Westinghouse Electric and Manufacturing Company, East Springfield, Mass.

New Wiremold Fitting

The Wiremold Company, Hartford, Connecticut, announces development of a new fitting, No. 3046A, designed to take the 20 amp. twistlock type receptacle or any standard device when mounted in Wiremold No. 3000. The special feature of this fitting, particularly in reference to the 20 amp. twistlock type receptacle, is that it provides ample wiring space.

This fitting has already found extensive use in industrial plants for



WELDING has probably contributed more to the improvement and speeding up of war production than any other single process. It saves time and money. It is a potent production weapon that women have learned to use as skillfully as men.

Here, again, electricity plays a vital role. Unfailing electric power must feed these modern tools. And unfailing power requires unfailing transmission and distribution—a job that can be entrusted only to electrical wires and cables of the finest quality.

For years, American Steel & Wire Company engineers and production experts have experimented with new methods and new materials to improve the quality of our electrical wires and cables. The war proved the soundness of this policy, for the sudden scarcity of certain critical materials did not catch us napping. New materials were available to help the conservation program without sacrifice of quality or performance. Our products were ready when the emergency came; and they'll be ready when peace comes.

For our research goes steadily on—working on new ideas and developments to take care of the increased wartime demand for power and light and the ultimate conversion to peacetime requirements.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* — United States Steel Export Company, New York

UNITED STATES STEEL

In Which We Serve

This is the story, briefly told, of men and women who turned from the arts of peace to the grim trade of war. And in their story of individual achievement you may read the story of America.

In December, 1941, the men and women of Kelvinator were building the revolutionary Moist-Master Kelvinator Refrigerator, which provided ideal humidity for keeping uncovered foods fresher days longer. Based on Kelvinator's remarkable sales advances in 1940 and through 1941, Kelvinator retailers —backed by the industry's soundest franchise—were looking forward to the greatest sales gains in refrigerator history.

And then, virtually overnight, the men and women of Nash-Kelvinator, so well versed in production for peace, turned to production for war.

Now in this December, two years after Pearl Harbor—what account can we and they render of our war service?

This . . .

Having designed and built the incredibly precise Polarsphere Sealed Unit, we are now building intricate Hamilton Standard propellers for Flying Fortress, Liberator, Mosquito, Mitchell, Lancaster, Baltimore, Dauntless, Havoc, Skytrain and Skytrooper planes. And we have become the largest manufacturer of this type of aircraft propeller in America.

SCRAP IS POWER

Cooperate with your industry! Salvage all inoperative parts containing critical material . . . put vitally-needed scrap back into the scrap TODAY!

Freedom...

We are building the great 2,000 h.p. Pratt & Whitney supercharged, eighteen-cylinder engines that power the Vought Corsair fighters of the U. S. Navy. And these are the planes that are helping to break the back of Japanese air power.

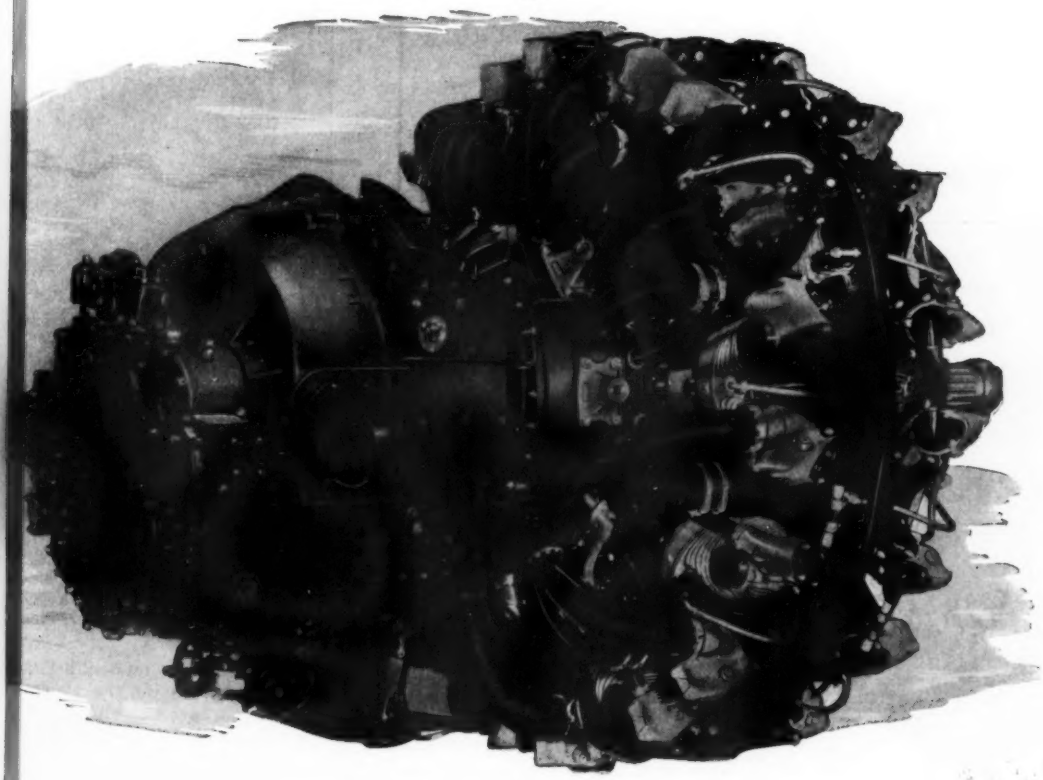
We are now readying our production lines to build Sikorsky helicopters for the Army Air Forces. And this newest aerial marvel, which can rise vertically, hover motionlessly, fly forward or backward, will be built only by Nash-Kelvinator and its designers, the Sikorsky Division of United Aircraft Corporation.

Having a reputation for precision manufacturing, we are building governors for the propeller mechanisms of Flying Fortress, Douglas, Consolidated North American and Martin bombers—and Navy PBY1 and PB4Y1 patrol bombers. And, we are now one of the largest manufacturers of binoculars in the world.

In this brief period of less than two years, Nash-Kelvinator facilities have been expanded tremendously and our production for war is now virtually double our former production for peace.

This is how we have served America . . . have served you . . . are serving freedom. This is the story of how free men and women, with the will to stay free, the desire to keep America always a land of progress and individual opportunity, are working day and night to hasten Victory so that they may turn once again to the building of an even finer Kelvinator.

The men and women of the Propeller Division of Nash-Kelvinator Corporation have been awarded, and proudly fly and wear, the famous Army-Navy "E" for High Achievement in War Production.

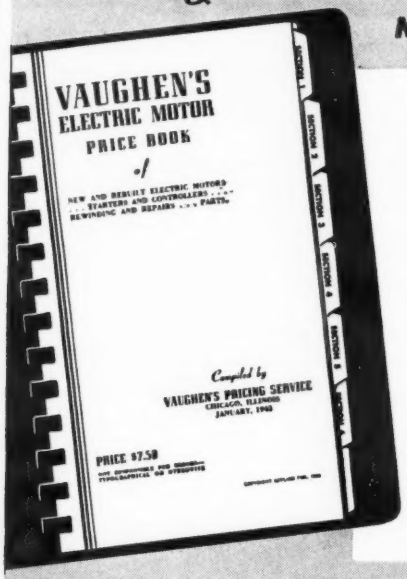


LOOK AHEAD WITH KELVINATOR

DIVISION OF NASH-KELVINATOR CORPORATION

How Do You Price Electric Motor Rebuilding Jobs?

Don't Guess Use Vaughen's Electric Motor Price Book



Here, in one handy volume, is a COMPLETE price list of new and rebuilt electric motors, starters, and controllers, rewinding, bearings, reconnecting, turning commutators, and practically every other electric motor repair job. It covers all sizes of A.C. and D.C. motors and generators from 1/6 to 200 horsepower.

The prices listed are based on actual cost records in repair shops and represent a price that is fair to both you and your customer. Be safe, get a copy of Vaughen's Electrice Motor Price Book now . . $7.50. Send your order to:

INSULATION & WIRES, INC., 2127 Pine St., St. Louis, Mo.

HEATFLO
THE CHROMALOX UNIT
for range replacements

Get quick and expert cooperation from our representative nearest you—or write us direct.

Atlanta, Ga.—C. B. Rogers
100 Peachtree St., N.E.

Dallas, Tex.—L. R. Ward
403 Southland Bldg. Annex

Raleigh, N. C.—
W. R. Phillips

The replacement unit for electric ranges that SPEEDS UP SERVICING, because it fits all ranges . . . SPEEDS UP COOKING because it delivers heat the fastest way—by contact . . . SPEEDS UP CLEANING because spilled food is quickly wiped off its all-flat top. This is the Chromalox unit in battle dress—Thousands in service since before Pearl Harbor, prove its quality.

Chromalox Range Unit repair parts, available without priority, under WPB limitation orders.

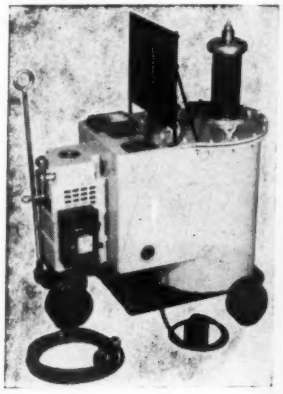
EDWIN L. WIEGAND CO., 7600 Thomas Blvd., Pittsburgh 8, Pa.

bench wiring, dollies, and in other locations where heavy duty receptacles are required for portable tools.

The illustration indicates the features of the fitting and also its application when used with a twist-lock type receptacle.

50-Kv Portable Test Set

A newly designed 50,000-volt portable test set for use on single-phase 115- or 230-volt, 50- or 60-cycle circuits has been announced by the General Electric Company. The set is intended for application in cable factories, industrial plants, central stations, laboratories, and wherever high voltages up to 50,000 volts are required for testing electric apparatus or insulating materials.



This 50,000-volt (5-kva) portable set combines in a compact unit an oil-insulated testing set, a high accurate indicating voltmeter, a volt meter selector switch, and complete control equipment, such as air circuit breaker, line switch, foot switch and induction voltage regulator. The testing transformer is designed with liberal safety factors to withstand the stresses encountered in testing service. A screened safety guard separates the operator and the high-voltage bushing, and a red light warns the operator whenever the set is energized.

The indicating voltmeter has a large dial which shows the applied test voltage in kilovolts. For greater accuracy throughout the complete range, the meter has a double scale —one for voltages up to 25 kv and the other for voltages from 25 to 50 kv. The meter is connected to a voltmeter coil wound on the main transformer. It gives a highly accurate indication of the actual test voltage under all conditions.

Wiring Maintenance Helps

A new folder just issued by the Ideal Commutator Dresser Company, 1287 Park Ave., Sycamore, Ill., de-

scribes and illustrates a wide range of products designed to speed plant wiring changes, maintenance, additions, and repairs. The folder gives information on Ideal Wire-Nuts, a number of Ideal fuse devices including test light and fuse pullers, fuse reducers, fuse clip clamps, and "Safe-T-Grip" fuse pullers, and numerous other items of interest to the installation and maintenance electrician.

Booklet on EMT Bending

A new booklet which shows how to bend electrical metallic tubing easily, accurately, and economically, has been announced by the Steel and Tubes Division, of Republic Steel Corporation, 224 East 131st Street, Cleveland, Ohio.

This handy 68-page pocket-sized booklet contains diagrams, photographs and tables showing the reader how to make accurate stubs, perfect back-to-back bends, uniform stubs in quantity, true offsets, saddle bends, and sharp radius bends. It also shows how to saddle a beam, shift stubs, correct knocked-over stubs, and straighten and rebend electrical metallic tubing.

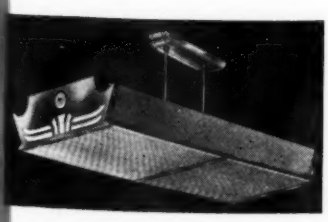
The booklet also explains how to obtain best results with ease and accuracy with Republic "Inch-Marked" Electrunite Steeltubes, using both the Electrunite and Hickey benders. A copy of the booklet will be mailed promptly upon request to Dept. S, Steel and Tubes Division, Republic Steel Corporation.

Mitchell URC Luminaire

A new, improved "lightweight" Mitchell U. R. C. Research Luminaire, designed to use less than 6 lbs. of metal in accordance with the latest WPB regulations, is now available for stores, offices, buildings and institutions on a priority of A-1-J or higher.

This shielded 200-watt 4-light commercial fluorescent fixture provides all the original Mitchell features. It combines high intensity illumination with low surface brightness—eliminates excessive glare—makes possible greater lighting efficiency.

The Mitchell U. R. C. Research Luminaire is extremely flexible. The one Model No. 2032 is adaptable for every type of interior—for surface or pendant mounting, for individual



NEW

For 100-WATT LAMPS

General Electric introduces the FS-100 Watch Dog* Starter for 100-watt lamps, offering a further contribution to efficient fluorescent lighting service. This new starter is a four-contact glow-switch type with the same outstanding features as the popular FS-40 Watch Dog.

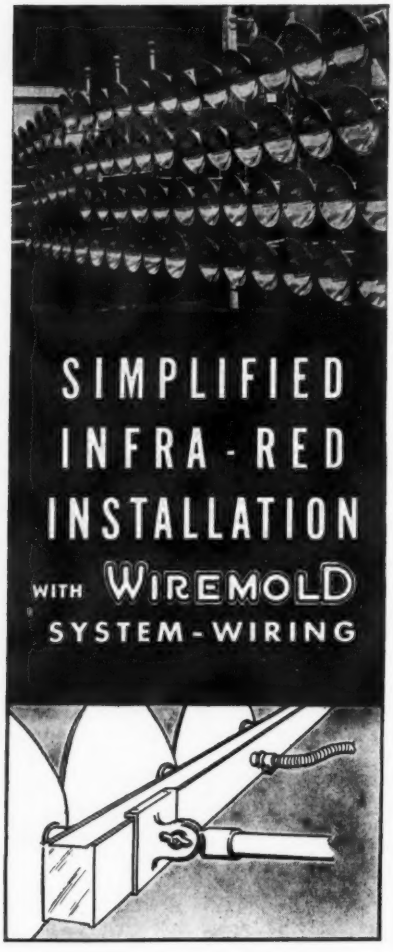
The FS-100 is an accurate device that prolongs the life of both starter and ballast by providing controlled starting. In short, it's a precision device that starts a lamp not too soon, not too late . . . but right!

The FS-100 is also a dead lamp stopper. It eliminates annoying blinking and flickering immediately and positively.

For additional information, write for the new G-E Fluorescent Accessories Catalog. Send your request for a free copy to Section G1135-16, Appliance and Merchandise Dept., General Electric Company, Bridgeport, Conn.

*Reg. U. S. Pat. Off.

GENERAL ELECTRIC



● Use of Wiremold Channel and Fittings permits compact and efficient grouping of lamp units with ample structural strength, easy adjustability and a simple, adequately protected method of wiring. Illustrations above show a typical bank of infra-red heating lamps and the manner in which they are installed on Wiremold No. 3000 Channel, using conventional type sign receptacles. Detailed drawing shows method of supporting channels by means of Wiremold No. 3008F adjustable hanger fittings, also cable feed connection through K. O. in back of channel.

For further details of fittings and installation send for new Engineering Data Sheets covering applications of this type.

The Wiremold Company
Hartford 10, Conn.

WIREMOLD
CAN HELP YOU PRODUCE FOR WAR . . .
AND PLAN FOR PEACE!

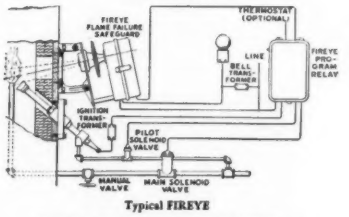
or continuous row lighting. Installation is quick and easy. The unit is easy to relamp and maintain. Glass panels are readily removed for cleaning or relamping, without the use of tools. Starters are replaceable without disturbing lamps. Wiring channel is accessible simply by removing two wing nuts. Any unit in a continuous row may be disconnected completely and easily at any time.

The overall design is modern and functional—pleasing to the eye—suitable for any commercial installation. The new improved Model No. 2032 is offered at the original low price. Delivery starts after December 1st. For free bulletin and further details, write to the Mitchell Manufacturing Company, 2525 Clybourn Avenue, Chicago 14, Illinois.

Photoelectric Flame Monitor

Fireye Type F28C, a photoelectric system for providing instantaneous fuel cut-off in any pressure-fed burner in the event of flame failure, is announced by Combustion Control Corporation, 77 Broadway, Cambridge 42, Massachusetts. Capable of monitoring flame of any intensity, the system is applicable to oil, gas, or pulverized coal burners and is the first to operate entirely from direct observation of the flame itself rather than wholly or partly from such secondary flame characteristics as temperature or electrical conductivity. Because Fireye is actuated not by the effect of flame failure, but by the actual presence or absence of flame, it operates immediately and therefore completely eliminates the explosion hazard present when even a few seconds before fuel cut-off.

FIREYE Type F28C



Typical FIREYE
Installation For Automatically Ignited Oil Burner

Guth Quick-Liter

The new Quick-Liter is a [illegible] powered industrial luminaire operates standard 40-watt and [illegible] watt fluorescent lamps. Quick-L[illegible] super-ballast utilizes a patented [illegible] ing circuit that starts lamps wi[illegible] the use of starter switches. O[illegible] tion on wider varying voltages [illegible] temperatures are also claimed [illegible] Quick-Liter.

The new Quick-Liter is avai[illegible] in sizes for 2-40 watt and 2-100 [illegible] lamps, either 110-120 or 22[illegible] volts. All wiring and ballasts [illegible] fully enclosed in a new top-ho[illegible] which conforms to latest WPB [illegible] limitations. Positive "flexible [illegible] ger" supports allow quick eas[illegible] flector removal. Bump-Proof [illegible] plates give added lampholder [illegible] tection.

The reflector is Guth-formed [illegible] onite "Reflector-Board" and is [illegible] ished "300° white" high-baked [illegible] thetic enamel. Eggcrate louvre[illegible] available for lamp shielding, w[illegible] desired. Immediate shipment ca[illegible] made. For further details writ[illegible] rect to The Edwin F. Guth Comp[illegible] 2615 Washington Blvd., St. L[illegible] Mo.

Pressure-Treated Wood

Uses of pressure-treated lu[illegible] in the utility field comprises [illegible] section of a new book on prese[illegible] wood just issued by Koppers C[illegible] pany, Wood Preserving divi[illegible] which is offered as a guide in [illegible] terial selection for utility engine[illegible] contractors and maintenance su[illegible] intendents.

A special section of the book, "[illegible] onomical and Permanent Const[illegible] tion with Pressure-Treated Wo[illegible] explains the several processes [illegible] which lumber is treated to pro[illegible] it against decay, marine borers, [illegible] mites, acids and fire.

Pictured are a number of typ[illegible] installations in the utility field, [illegible] cluding pressure-creosoted transf[illegible] er stations, and telephone and [illegible] graph lines for over-water and [illegible] lines. There also is a reference [illegible] of recommended uses of press[illegible] treated lumber in the utility and [illegible] er fields.

A copy of the book may be [illegible] tained by writing to Koppers C[illegible] pany, Wood Preserving Divi[illegible] Pittsburgh.

Training Films

A new type catalog-directory, classifying a wide range of visual training aids now available for the electrical field, is announced by The Jam Handy Organization, 2900 E. Grand Blvd., Detroit, Mich., and will be sent free upon request.

By a system of indexing, cross-indexing and classifying many varied teaching slidefilms and motion pictures for electrical training purposes, the instructor is enabled to quickly locate the subject wanted by a mere flip of the page. In addition, "previews" of each slidefilm and motion picture are provided in the form of large, vivid illustrations of sequences reproduced directly from the films themselves. In other words you "see what you are going to get" in advance.

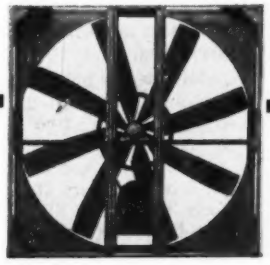
This saves time and labor for the instructor who otherwise would be compelled to engage in extensive film research work. The new catalog-directory is printed in color, comprises 80 pages, and contains much valuable detailed information, including the number of individual frames or pictures in each slidefilm subject, and in each series. It also gives a brief outline of the material they contain. Another feature of the catalog shows what types of projectors are best suited to various electrical training purposes.

Instantaneous Fluorescent

Instantaneous starting of fluorescent lighting units has certain advantages in many industrial plants. The response to Fostoria's Model MF-240-N has established the need for this type of fluorescent unit and has resulted in the addition of it to the line of Generalite equipment for illuminating work area surroundings, when used in conjunction with localities for lighting critical work areas, "balanced" lighting results.

Model MF-240-N eliminates the use of starting switches. It provides average lumen output, low voltage operation and satisfactory lamp life; important features in any fluorescent unit. Elimination of starting switches cuts down maintenance costs resulting from replacement; it also means that there is no blinking of lamps when their life is near end.

NOW IS THE TIME TO SELL
. . . NEXT SUMMER'S NEEDS



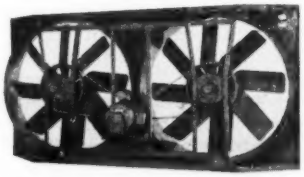
Coolair
TRADE MARK
Exhaust FANS and BLOWERS

WHILE WPB Regulations do not permit us to accumulate a warehouse stock of Coolair Fans, our plant has been able, up to now, to make reasonably prompt shipment on all priority rated orders.

But this favorable situation may not prevail at the time your customer plans to install Coolair Fans for ventilating and cooling workrooms and processing spaces in his plant.

For this reason we urge you to survey his needs, sell the order now and place it with us while we still have the production capacity and necessary materials and supplies for their manufacture and in this way insure prompt delivery of his complete order when needed.

Should CMP Regulation 5 not cover his requirements, help your prospect prepare and file form PD-1A with his nearest WPB Field office.



TWIN UNIT FAN: Widely used where limited headroom or vertical wall space does not permit use of adequate sized single unit Coolair Fan.

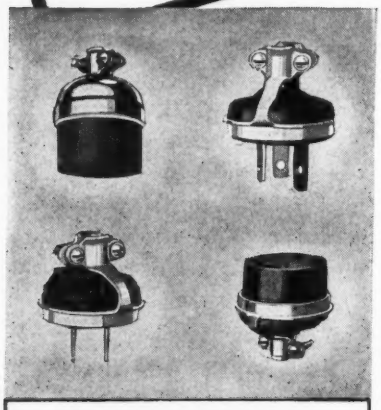
PROMPT SHIPMENT . . . can still be made on many types and sizes of Coolair Fans on orders bearing a priority rating of AA-5 or better.

A full description of the Coolair line, with tables showing models, dimensions, performance data, etc., can be found in
SWEET'S CATALOG A.S.H.V.E. GUIDE
ELECTRICAL BUYER'S REFERENCE

AMERICAN COOLAIR CORPORATION
3604 Mayflower Street Jacksonville, Florida

BRYANT

CONNECTING DEVICES



FOR WARTIME INDUSTRIAL SERVICE

These Bryant Connecting Devices, in use in thousands of the nation's key industrial plants, help assure the uninterrupted production schedules so vital to Victory! Superior in design and construction, made of finest materials, they maintain good contact, give long, faithful service under toughest conditions.

No. 5103 Top, left. Armored cord connector with "T" slots.

No. 9112 Top, right. 3-wire armored cap with cord grip.

No. JK Lower, left. Composition cap with cord grip.

No. 9114 Lower, right. 3-wire armored cord grip connector.

Sold Through Electrical Wholesalers

THE

BRYANT ELECTRIC COMPANY

Bridgeport, Connecticut

New York
San Francisco

BRYANT
SUPERIOR WIRING DEVICES

Chicago
Los Angeles

The lumen output of MF-240-N is approximately the same as Fostoria's MF-240, powered by conventional ballast, which is 4200 lumens when using 3500° white lamps. This unit will continue to operate even though the voltage drops momentarily below 50. Lamp life with this unit is considered satisfactory, although lamp manufacturers say that a reduction of as much as 50% may be expected. Elimination of starting switch costs help balance any decrease in lamp life which may be experienced.

MF-240-N operates on a power factor of 98% at 118 volts and is connected for stroboscopic effects. It is designed to accomodate two 40 watt fluorescent lamps mounted on 5 inch centers and is built to conform to Bureau of Standards recommendations. Like all other Generalite Models, MF-240-N is connected with the "V" wiring channel which separates the two lamps and thereby eliminates light absorption from one lamp to another.

Ease of maintenance is one of the outstanding features of all Generalites since the non-metallic reflectors are removable from the top without interrupting lamp operation. When the reflectors are removed, all wiring in the "V" channel is exposed to full view.

Silex Restaurant Model

The outstanding service of Silex glass coffee makers in our Army, Navy and Marine forces in all parts of the world is strikingly illustrated in the Silex Restaurant Model and Ship Model. Catalogues are now being distributed.

The new Silex Restaurant Model catalogue pictures and describes the popular Traymore and Terrace Electric models, parts and accessories used in thousands of Post Exchanges, canteens, on ships of war and merchant fleets, transport planes and war plant lunch rooms. These models have been widely adopted by the Army, Navy and U. S. Maritime Commission and War Shipping Administration.

The new Silex ship model catalogue illustrates and describes four models created for Navy and Maritime use. These models have features specially designed for hard service and unusual conditions encountered on ship board. These special features include bracket mountings to hold bowls firmly in place; Melamine plastic upper bowl which is practically unbreakable; spring tension filters; self timing heating elements and special formula heat resistant glass lower bowls.

Copies of both catalogues are available by writing The Silex Company, Hartford, Connecticut.

Floatless Level Controls

A twenty-eight page catalog No. 943 which features their All Electric Floatless liquid Level Control, and marks the tenth anniversary of this company which pioneered floatless controls, has just been released by the B/W Controller Corporation, Birmingham, Mich., In addition to describing the primary equipment such as electrodes, relays, etc., required for the installation of an All-Electric Floatless Liquid Level Control, there are included special controls and panels; a-c automatic starter and relay combinations, selector switches, special relays, waterproof enclosures, wiring diagrams (twelve of the most popular type of installation are covered), etc. B/W systems of liquid level control are effective to within ¼" variations in any fluid that is an electrical conductor.

Statement of Ownership

Statement of ownership, management, circulation, etc., required by the Act of Congress of Aug. 24, 1912, and March 3, 1933, of Electrical South, published monthly at Marietta, Georgia, for October 1, 1943.

State of Georgia, County of Fulton.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared J. C. Martin, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Electrical South, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication, for the date shown in the above caption required by the Act of August 24, 1912, as amended by Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form to-wit:

1. That the names and addresses of the publisher, editor and business manager, are:

Publisher, W. R. C. Smith Publishing Co. Atlanta, Ga.

Editor, Carl W. Evans, Atlanta, Ga.

Business Manager, J. C. Martin, Atlanta, Ga.

2. That the owners are:

W. R. C. Smith Publishing Co., Atlanta, Ga.; Estate of W. R. C. Smith, Atlanta, Ga.; J. C. Martin, Atlanta, Ga.; O. A. Sharpless, Atlanta, Ga.; T. W. McAllister, Atlanta, Ga.; W. J. Rooke, Atlanta, Ga.; E. W. O'Brien, Atlanta, Ga.; J. C. Cook, Atlanta, Ga.; R. P. Smith, Atlanta, Ga., and Mrs. E. L. Philpot, Atlanta, Ga.

3. That the known bondholders, mortgagees and other security holders, owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities, are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security company but also in cases where the stockholders or security holders appear upon the books of the company as trustees or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company, as trustee hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than so stated by him.

J. C. MARTIN,
Business Manager.

Sworn to and subscribed before me this 6th day of October, 1943.

SEBA J. JONES,
Notary Public at Large.

SPEED-UP BENDING JOBS...

with

GREENLEE BENDERS

Tailor-Made Attachments for:

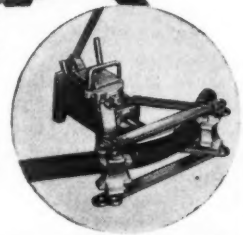
- Copper Pipe, Std. Pipe, Rigid Conduit (I. P. S.)
- Thin-Wall Conduit
- Tubing (All Types)
- Bus-Bar

Only one power unit is required for most jobs.

Fast, easy to operate

90° Radius-Shoe Attachment

Segment-Shoe Attachment on No. 770 Power Unit



You can save vital hours on war jobs, today, with Greenlee Benders. These powerful, hydraulic benders form smooth, uniform bends in a jiffy—eliminate tedious filling and heating methods—save as much as 75% on many jobs. Tailor-made attachments prevent kinks and serious distortion—are interchangeable—only one No. 770 power unit is required for most jobs.

ATTACHMENTS FOR EVERY BENDING JOB!

For fixed-radius bends up to 90°, two standard sets of radius-shoe attachments are provided. One set bends ½" to 2" thin-wall conduit (E.M.T.); second set handles ¾" to 2" copper, brass, aluminum, or steel pipe (I.P.S.). For varying radius bends, a set of segment-shoe attachments is provided for ¾" to 3" rigid-conduit or standard pipe. Also available are special attachments for all types of tubing and for bus-bar bending. *All are interchangeable and can be used on Greenlee No. 770 power unit.* For larger conduit and pipe up to 4½", a more powerful Bender — the Greenlee No. 775 — is provided, complete with attachments.

NEW SMALL-RADIUS HAND BENDERS STOP KINKS

Forming small-radius bends in all types of small tubing, pipe, or conduit is a fast, easy task with Greenlee Hand Benders. They make smooth, neat-looking bends without kinks, wrinkles, or serious distortion. *Write for New Circular S-120.*

WRITE FOR CATALOG 33E and Latest Bender Booklets

Greenlee TOOL CO.

1771 COLUMBIA AVE., ROCKFORD, ILL.

Inspectors Discuss Wartime Code Problems

(*Continued from page 31*)

He closed by saying that not one act of sabotage has occurred in the Port of New Orleans.

Victor H. Tousley, next on the program, discussed inspectors' war problems. He also expressed his desire to see more activity in the various chapters as he feels the chapter is the backbone of the organization. Among the war subjects discussed were substitute materials, increase in electric welding due to war, infra-red drying in regard to branch circuits, and post-war problems.

Mr. Tousley advised that as a result of a WPB action, 50% of normal output of iron cords will be made available to the public, also a very generous amount of copper will be released to the trade without priority to be used for repairs and replacements only. This WPB order will include flexible cords also.

Campbell Palfrey, State Fire Marshall for Louisiana, was the next speaker. Mr. Palfrey assured all the members of the close connection between his department and the Fire Prevention Bureau, municipal electrical inspectors and the utilities. He attributes the low fire loss in Louisiana mainly due to education of the school children, Parent-Teacher Associations, and Junior Fire Departments.

Machine tools was the topic of a talk by L. F. Adams. Due to war conditions Mr. Adams said that more than three times the amount of machine tools are now in use over normal times.

The IBEW was represented by Herbert Fisher, of Local 130, who related some of their difficulties in securing and training mechanics for the war plants in this locality. Men with small knowledge of electrical construction, such as auto and radio men, were schooled alongside the skilled mechanics to meet the emergency.

The Monday afternoon session concluded with a motion picture showing the effectiveness of water fog sprinkler systems in extinguishing oil fires, courtesy of Rockwood Sprinkler Company.

Tuesday morning the meeting opened at 9:30 A. M. with M. M. Brandon's paper on "Hazards of Electric Welding." Mr. Brandon stated that it was the welder's first thought to get the job done

This new McGILL portable safety guard allows you to take the light where it is needed. It is watertight, vaportight and moisture-proof. The plastic handle, and fibre case are shock-proof, non-sparking, and entirely free from metal. No splashing of liquids can harm this guard or cause breakage of light bulb.

The extra strong fibre swivel hook allows you to hang it where you will. Its attractive handle is of unbreakable plastic, with a plastic screw nut tightening on a rubber bushing inside the handle. Its strong fibre cage is treated to prevent warpage. We recommend it for safety, service and convenience, around flour mills, airports, shipyards, aboard ships, warehouses, food processing plants, paint booths and finishing rooms.

McGILL MANUFACTURING CO., INC.

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Roughing-In Wiring Systems
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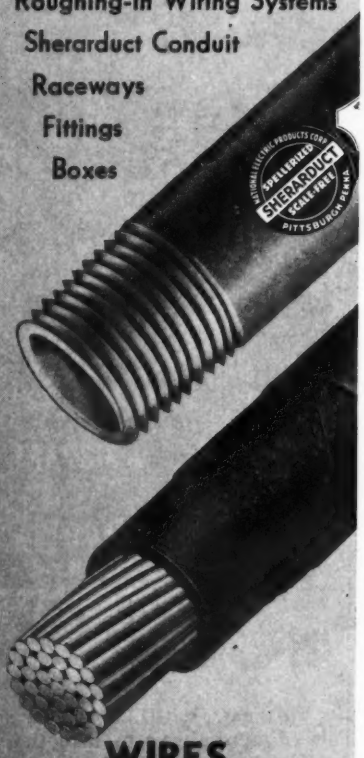


WIRES
AND
CABLES

Rubber
Synthetic
Varnished Cambric
Lead
Steel

National Electric
PRODUCTS CORPORATION
Pittsburgh, Pa.

and not watch sparks. His suggestion was to be sure all combustible materials were removed to at least 30 or 40 feet from the point where the welding was being performed, also to be sure that cracks in the floor were suitably covered and that curtains and shields were always kept in place. Fire watchers should be stationed at each job and they should be provided with, and have full knowledge of the use of fire appliances. A competent electrician should be in charge of all electric welding machine installations.

Destruction of metals by electrolysis was defined by Robert J. Kuhn as the wasting away of metals by the action of a positive direct current flow between the metal and the moist earth. Mr. Kuhn went into a lengthy and technical discussion on this subject and also distributed copies of his paper, which included several sketches.

Milton L. Levy, of Higgins, Inc., next discussed the problem of war-time maintenance. He opened his talk with thanks to the Fire Prevention Bureau, the New Orleans Public Service and the New Orleans Electrical Inspection Department for their help when he needed help most, as war plant problems come thick and fast. His first thought is the safety of the men, as the majority of the employees do not realize the hazard from unprotected electrical installations. Because of the rapid growth of the plant, considerable temporary wiring was necessary in order to meet the needs for production. However, in all cases automatic overload protection was provided on each feeder and appliance circuit.

The big job in the yard is the maintenance of the several hundred motor generator welding machines which must be kept humming. Mr. Levy's talk was very practical, and it was delivered in every day "electricians' talk."

Frank Camus asked the Code panel experts to be seated at the panel table and panel discussions were resumed. Some of the problems presented were as follows:

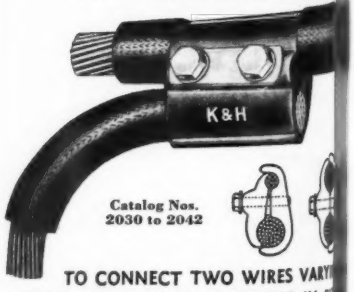
(4) Explain why fine print after Interim Amendment Section 2371 A-3, Page 6 S, only permits bridging of main fuse in sealed service enclosures and not in unsealed enclosures.

Answer: Mr. Tousley volunteered to answer this question by saying that the intent of this interim amendment was to conserve gasoline, tires and manpower. He brought out that there were three conditions that must be kept in mind before this bridging is done: (1) for the duration of the war emergency; (2) in existing installations, and (3) provided with sealed overcurrent protection. It was understood that if the overcurrent protection was not sealed, bridging would not be necessary as the fuses would be accessible for renewal.

The first speaker on the afternoon program was B. P. Caldwell, assistant secretary of Underwriters' Laboratories, Inc. Mr. Caldwell told of the necessity of emergency standards and the procedure in their adoption by the Laboratories. To date, 125 emergency standards are in effect. The purpose of the standards is to save critical materials needed for the war effort, but safety is considered as the first factor. It was his belief that some substitute materials may work out satisfactorily even after the war; in some cases, they may prove better than

A Live Wire is no better than its Connection

UNIVERSAL PARALLEL TAP CONNECTOR



Catalog Nos. 2030 to 2042

TO CONNECT TWO WIRES VARYING EITHER GREATLY OR SLIGHTLY IN SIZE OR TWO OF THE SAME SIZE

The tightening bolts exert an equal pressure on both wires regardless of size. The clamping surface is large and covers a contact area several times greater than the cross-section area of the wire themselves. Locking feature insures a permanent connection.

• WRITE FOR BULLETIN 15-A

K&H KRUEGER & HUDEPOHL
Solderless Terminal Lugs and Connectors
VINE AT THIRD-ES • CINCINNATI

some pre-war materials.

Prof. A. M. Hill, of Tulane University, spoke on safety in industrial establishments. The safety problem has become critical in war industries with the manpower shortage and the bringing in of new and green labor. To curb this problem, Mr. Hill reported that courses in industrial safety engineering have been established. Classes are held at night, usually twice a week for sixteen weeks with a total of 96 hours. To impress the importance of safety in all fields, safety in traffic, safety in the home and in sports, Mr. Hill said that 30,000 persons were killed in "off-the-job" accidents in 1942; and this does not include traffic accidents.

A motion picture with sound was presented by Arthur Naquin, of New Orleans Public Service, Inc., on safety engineering. The picture followed closely Prof. Hill's talk and demonstrated some hazards that are encountered in industrial plants. Six main causes of accidents were demonstrated in the picture: unguarded machinery, failure to use personal protective equipment, unsafe use of tools, horse play, lack of knowledge or skill, and undue haste.

The panel discussions were resumed and the following problems were discussed:

(6) May Type EI wire be used for the ungrounded conductor where run in concealed spaces?

Answer: No. EI wire is only approved for the grounded conductor when run in concealed spaces. Reference was made to Section 3005 of the supplement.

(7) Does Interim Amendment No. 41, mean that we are to discard entirely Tables Nos. 1 and 2, of the 1940 Code, and use only Table No. 1, of the 1937 Code, in so far as current carrying capacities of rubber covered wire is concerned?

Answer: Mr. Tousley volunteered to answer this question by saying that the 1937 table may be used if desirable.

(8) Why is it that non-metallic sheathed cable in Article 3362 is not approved in some wet locations and is approved in other wet locations? (Dairy barns.)

Answer: Considerable discussion resulted from this question mainly as to whether dairy barns were considered a wet location. Mr. Welman stated that he had never seen a dry dairy barn. One

Curtis INCANDESCENT for High Efficiency Installations

Still THE FINEST INCANDESCENT REFLECTOR

In spite of all the progress made by the lighting industry . . . nothing has yet topped the efficiency of Curtis Silver Mirror "X-Ray" Reflectors!

By all odds this is your best bet for incandescent general lighting jobs in the industrial field.

When you've simply got to deliver the most useful light per dollar and when you've got to watch time and maintenance costs . . . you'll find this unit the answer to your problem and . . . the customer's enthusiastic satisfaction!

A wide range of types and sizes available, accommodating 300 to 1500 watt incandescent lamps or 400 watt Mercury lamps. The 589-T shown above is just one of the types described in detail on our specification sheet, Serial 2132 . . . write for your copy today.

X-Ray SILVER MIRROR REFLECTORS

Curtis LIGHTING, INC.
6135 WEST 65TH STREET . . . . CHICAGO—38

This gives you some idea of the difference in efficiency and RESULTS—when you use the ultra-modern BRIEGEL METHOD of making thin wall conduit connections instead of many old-fashioned methods still on the market.

You conserve critical steel—Briegel fittings are made with 25% less steel than any other fittings on the market.

You save time—just two squeezes with the patented B-M "indenter" (illustrated at left) and a smooth, clean connection is made. No extra turns or twists—no nuts to tighten. Up to 50% saving on precious time! *You save materials*—fewer items to buy and handle. MORE PROFIT ON EVERY JOB!

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THE ONLY TOOL YOU NEED (COSTS JUST $1.25)

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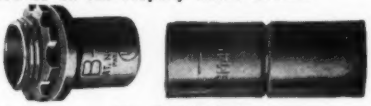

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Enameled Metals Pittsburgh, Pa.
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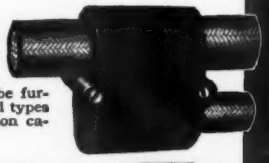
BRIEGEL METHOD TOOL CO., Galva, Ill.

from the MOST COMPLETE lin
of Cable Taps

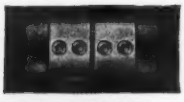
Now you can select from a really *complete* line of standard and special taps. Every one carefully designed and manufactured.

Parallel and 90° taps — and combinations — in the widest variety. For conductor sizes up to 1,000,000 CM.



Gutter Tap with Bakelite Cover. Insulating covers can be furnished for all types of Penn-Union cable taps.

2-way Gutter Tap. Main and branch sizes 8 to 1,000,000.



Two Separate Parallel Taps to a continuous main conductor.

Combination Cable Taps; one branch parallel to main, and one at 90°.

Hinged Clamp of Penn-Union Type HFM makes installation easy. Multi-slit tapered sleeve assures permanent grip on branch.

Positive Equalized Pressure on main and branch, with Penn-Union Type SM. Tightening torque is accurate measure of the clamping force.

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PENN-UNION ELECTRIC CORPORATION
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PENN-UNION
Conductor Fittings

member from the northern part of the country claimed the barns in his locality were fairly dry. It was finally referred to a special committee for study and to be referred to the proper Code committee for action.

(9) Can fluorescent fixtures be installed on ceilings or otherwise permanently attached and be electrically connected with portable cord? If so, what type of cord must be used, and what is the maximum distance from fixture that the receptacle can be installed?

Answer: The first part of the question was generally agreed, "yes." The answer to the second part of the question was that any approved type of cord could be used provided the heat condition would be considered. The last part of the question was answered that the length of the cord should not be longer than the greatest length of the fixture.

The annual banquet was held in the Grand Ball Room of the Roosevelt Hotel. Toastmaster Pendleton Lehde greeted the 246 in attendance and then introduced the principal speaker, Mr. Gung-Hsing Wang, Vice Consul, Republic of China. Mr. Wang expressed the friendly feeling between his country and ours. He stated that the Chinese people were peace-loving; that thy don't like wars; and that the only time they would use explosives was to celebrate weddings and births with firecrackers and skyrockets.

B. Z. Segall, the Convention Chairman, introduced the various committee chairmen and thanked them for the support given him toward the success of the convention. Choraliers of the New Orleans Public Service, Inc., furnished songs to add to the merriment of the party.

The Wednesday morning program consisted of Code panel discussions, reports of various committees and final adjournment until next year. The meeting place for 1944 is to be decided by the Executive Committee.

About 150 members and guests, including the ladies, left the Roosevelt Hotel at noon Wednesday on a motorcade, first to the White Kitchen for lunch, and then for a visit to Higgins Industries plant on the Industrial Canal. In order that no secrets may be revealed the writer will make no mention of any part of this visit since it is a war plant, but everyone who attended really got an eye-full of what goes on in a war industry.

Women At Work In Industry

(Continued from page 13)

floor girl, there is a woman ready to take it and capable of filling it well.

If you are dubious about it and don't like to gamble, start out by hiring a woman on a part-time basis. There are many whose husbands have gone to war who would jump at the chance of a job giving them time to do their housework.

If the problem of finding these women workers proves difficult, there are more than 1500 offices of the United States Employment Service eager and ready to help. Thousands of women desiring work either permanently or during the war emergency have registered with these Bureaus.

In some cities vocational training schools provide a good source from which to obtain women workers. Alert and public spirited utility companies are helping, too.

YOU CAN DEPEND ON

Sepco

1915 - 1943

ELECTRIC WATER HEATERS

ALTHOUGH WAR TIME CONSTRUCTED THEY STILL GIVE THEIR USUAL EFFICIENT, ECONOMICAL PERFORMANCE WITH THEIR LONG LIFE LOW WATTS DENSITY HEATING UNIT, THEIR POSITIVE SNAP ACTION THERMOSTAT AND MOST EFFICIENT HEAT INSULATION MANUFACTURED AND GUARANTEED BY

AUTOMATIC ELECTRIC HEATER CO.
POTTSTOWN, PENNA.

When "KNOW-HOW" is important

let MILLER do it!

The South's largest general electrical contractor offers you the experience gained from millions of dollars worth of successfully completed contracts for Army, Navy and civilian projects of all kinds including structural work and public utilities distribution systems.

Full equipment and engineering staff available to service any contract, regardless of size.

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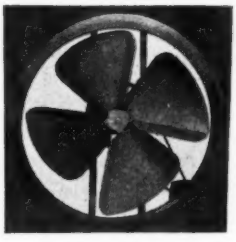
THE "Fresh-Air MAKER"

provides fully the comfort and ventilation so essential in army barracks, mess halls, hospitals, headquarters, theaters and other military buildings. Its fine design and sound construction meet the specifications drawn for army fans and it is particularly adaptable to the various types of installations found in army buildings.

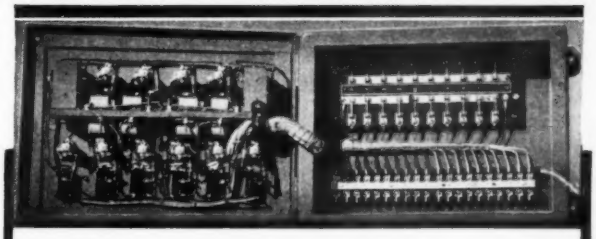


HY-DUTY BLOWERS

Single Inlet—Double Inlet. 400 CFM to 12,500 CFM.

Single Inlet Blower illustrated at left is particularly adapted for ventilation of mess halls in military establishments.

BLOWER DIVISION
SCHWITZER-CUMMINS COMPANY
1145 EAST 22ND STREET INDIANAPOLIS, U. S. A.



Marine Electrical Specialties

All types of electrical specialties, boxes, cabinets, control panels, duct-work, etc., manufactured by an organization accustomed to meeting exacting Army and Navy specifications. Full engineering personnel and equipment for manufacture of special electrical items in addition to all standard articles.

Write for information.

Jacksonville Metal Manufacturing Company
JACKSONVILLE, FLORIDA

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IDEAL Wire-Nuts

Solderless, Tapeless Wire Connectors

An alternate and improvement for solder and tape wire joints. IDEAL "Wire-Nuts" (Solderless, Tapeless Wire Connectors) contain no copper or copper alloys — no tin or rubber as used with solder-and-tape joints. Because "Wire-Nuts" do not require critical materials they are

IMMEDIATELY AVAILABLE

Easy to use; strip wires—screw on—that's all! Make a neater, safer joint. Better Electrically — Stronger Mechanically. Fully approved. Listed by Underwriters' Laboratories, Inc. Sizes for every job. Write for Free Samples.

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Give Better
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Many are already conducting schools where women can learn about the innards of the appliances they have used. Others keep records of available womanpower for dealers to employ.

Whatever your labor requirements might be, you will find that women will help to answer them. A former beauty parlor operator now inspects the delicate mechanism of anti-aircraft artillery, a grandmother's first away-from-home job is testing machine guns, other women fire the big guns and test mighty United States Army tanks. Women fly and service planes; they build them, too. They load logs, make rubber life rafts, are chemists and technicians. In Philadelphia, if you happen to be up that early, you will see a pretty girl saying "giddy-yap" to old Dobbin on a city milk route. She makes between 150 to 175 calls a day. In Bellmawr, N. J., a woman delivers the mail.

It all adds up. If you need help, employ a woman. For scores of dealers it will be not only the most patriotic but also the *smartest* solution to the labor problem.

Industrial Applications High-Frequency Heating

(Continued from page 10)

Induction heating is practical for either high or low production methods. Change-overs can be made quickly, making the handling of small lots practical. For continuous production, automatic induction heating units are easily installed. Other advantages are:

The regulation of heat input is instantaneously controlled.

Requires no physical contact between moving work and the electrical circuits.

Eliminates the time lost waiting for equipment to cool or reach processing temperatures, when servicing or making change-over adjustments.

The heat may be localized on internal surfaces for specific applications.

Particularly adaptable to high-speed production work—eliminating time and cost of conveying materials to and from heat-treating departments.

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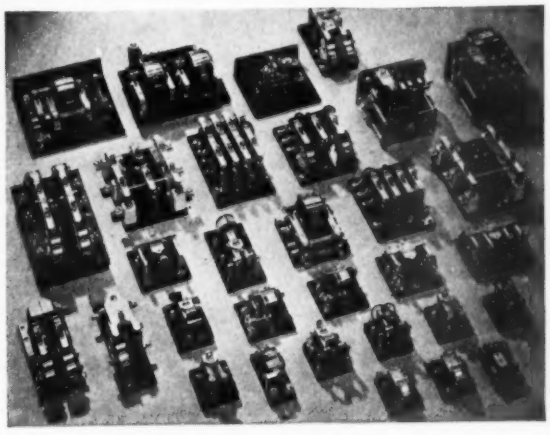

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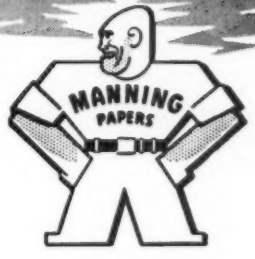

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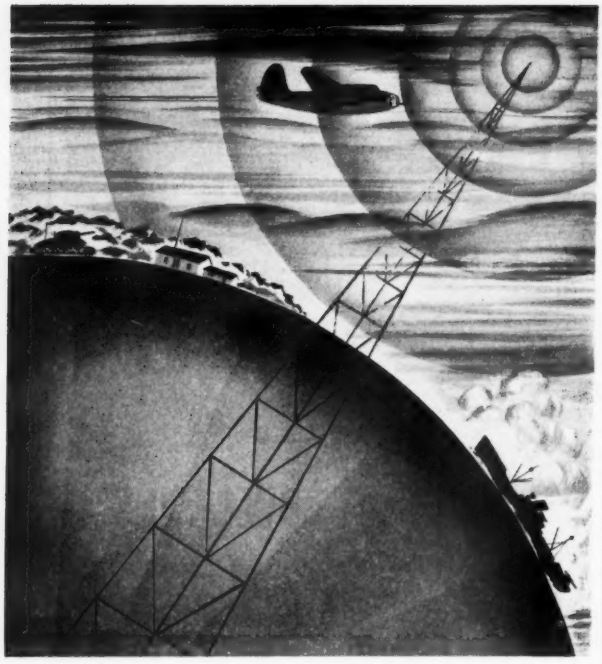

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A

Adam Electric Co., Frank
Aluminum Co. of America
American Coolair Corp.
American Steel & Wire Co.
Anaconda Wire & Cable Co., Inc.
Automatic Electric Heater Co., Inc.

B

Briegel Method Tool Co.
Bryant Electric Co.
Bull Dog Electric Products Co.
Burndy Engineering Co., Inc.
Business Press Industrial Scrap Committee

C

Crescent Insulated Wire & Cable Co.
Curtis Lighting, Inc.

D

Dolph Co., John C.

E

Edison General Electric Appliance Co. ....36 and

F

Frigidaire Division

G

General Electric Co. (Fluorescent Accessories)
General Electric Co. (Lamps)
General Electric Co. (Wiring Materials) ....Back Co
Graybar Electric Co.
Greenlee Tool Company

H

Hazard Insulated Wire Works
Helwig Company
Hotel Lennox
Hotel Mayfair
Hubbard & Company
Hunter Fan & Ventilating Co. Inc. ....Front Co

I

Ideal Commutator Dresser Co.
Insulation & Wires, Inc. ....52 and

J

Jacksonville Metal Mfg. Co.
Johns - Manville

K

Kelvinator Division ....50 an
Krueger & Hudepohl

L

Landers, Frary & Clark
Lloyd Products Co.

M

McGill Mfg. Co.
Miller Electric Co.
Mitchell Mfg. Co.

N

National Electric Products Corp.

O

Okonite Company

P

Penn-Union Electric Corp.

R

Rogers, C. B.

S

Schwitzer-Cummins Co.
Square D Company ....Inside Back Co
Sticht Co., Inc., Herman A.
Subox, Inc.
Sylvania Electric Products, Inc. ....Inside Front Co

U

United States Rubber Co. (Tape Division)
United States Rubber Co. (Wire Division) ....46 and
United States Steel Co.

W

Ward Leonard Electric Co.
Westinghouse Electric & Mfg. Co. (Lamps) ....2 an
Westinghouse Elec. & Mfg. Co. (Motor Controls)
Wiegand Co., Edwin L.
Wiremold Company

Y

Youngstown Sheet & Tube Co.

DEX

and not as a
ken to indic
re to insure

36 and

Back Co

Front Co

52 and

50 an

de Back Co

de Front Co

46 and

2 an

EMBER, 1